



Graduate School of Arts and Sciences

Northeastern University

1984–85

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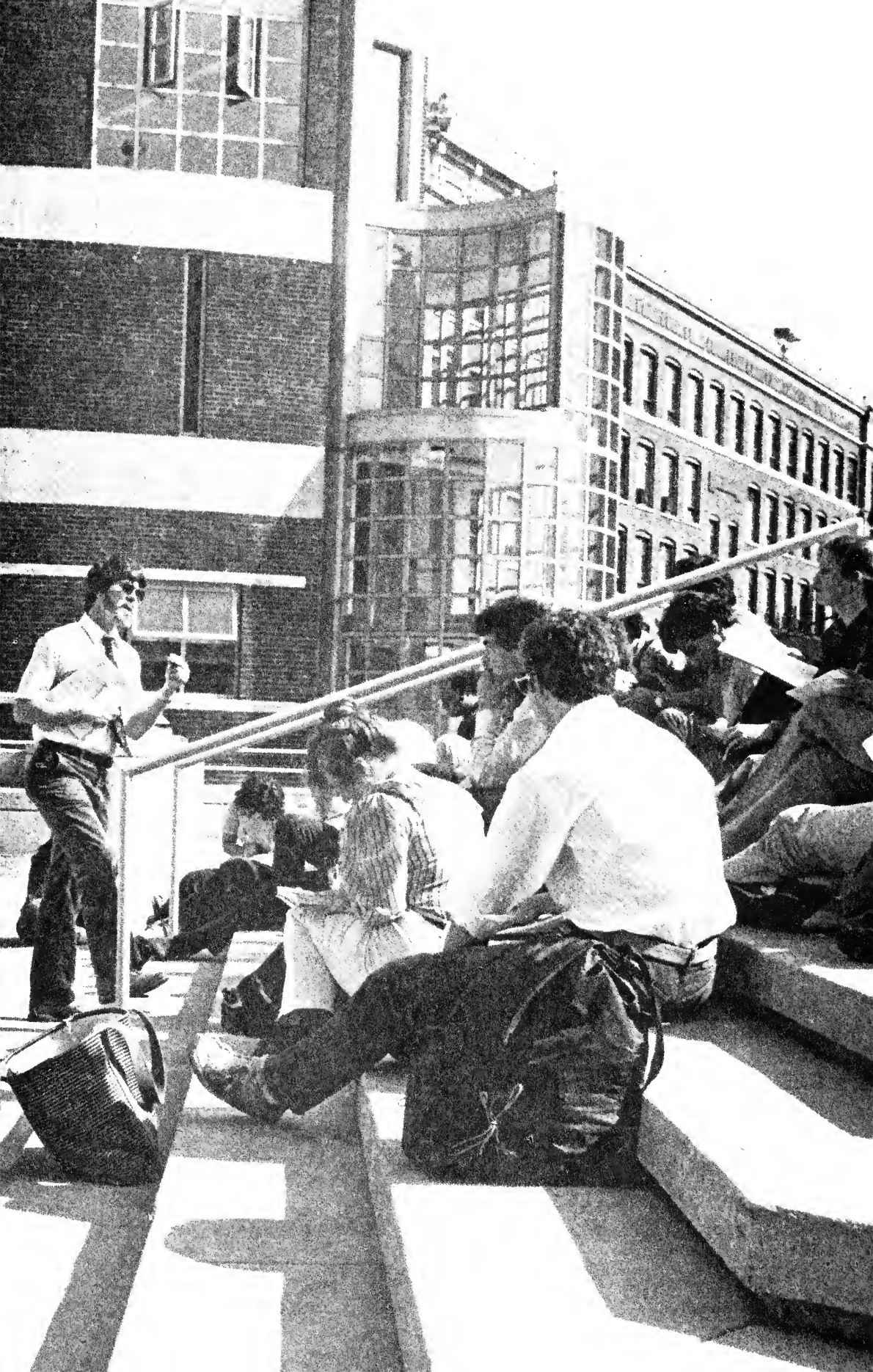
Graduate School of Arts and Sciences

**Northeastern University
1984–85**

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Introduction to Northeastern University



President's Message

We are pleased that you are considering Northeastern as the university for your graduate studies. Our graduate programs offer students academic excellence in an environment oriented to both scholarship and practical skills. The University is committed to having the highest quality faculty and to supporting research in all its disciplines.

Northeastern University offers a variety of programs within each of its nine graduate and professional schools. Each program has been designed to meet the interests and needs of graduate students and the professional climate of the 1980s. As a graduate student at Northeastern, you will find yourself working with students from diverse personal and geographical backgrounds, but with a common commitment to search and learn. These elements, in combination with our Boston location and proximity to many cultural attractions, help to foster an exciting educational environment.

As you read through this catalog, we hope you will find Northeastern's opportunities for graduate study as dynamic as we do. We encourage you to contact the appropriate graduate school with any further questions you may have. I look forward to greeting you, should you decide to pursue your education at Northeastern.

Kenneth G. Ryder
President

Graduate Degrees and Programs

Graduate School of Arts and Sciences

Master of Arts

Economics

English

History

Political Science

Psychology

Psychology: Applied Behavioral Analysis

Social Anthropology

Sociology

Master of Science

Biology

Chemistry

Economic Policy and Planning

**Forensic Chemistry

*Law, Policy, and Society

Mathematics

Physics

Master of Science in Health Science

Master of Technical and Professional Writing

Master of Public Administration

Doctor of Philosophy

Biology

Chemistry

Economics

**Forensic Chemistry

*Law, Policy, and Society

Mathematics

Physics

Psychology

Sociology

*Interdisciplinary program

**Interdisciplinary degree program

Certificate of Advanced Graduate Study
Advanced Literary Study

Certificate

Economics of Manpower and Development Planning
Technical Writing Training Program

*Graduate School of Boston-Bouvé College
of Human Development Professions*

Master of Education

Consulting Teacher of Reading
Counseling
 Career and Industrial Counseling
 College Student Personnel Work and Counseling
 School Counseling
Curriculum and Instruction
Educational Research
Human Development
Rehabilitation Administration
Rehabilitation Counseling (including specialization in
 Deafness)
Special Education
 Moderate Special Needs
 Severe Special Needs
 Special Education Community Personnel

Master of Science

Counseling Psychology
Physical Education
 Exercise Sciences
 Movement Behavior
Physical Therapy
 Cardiopulmonary Physical Therapy
 Neurological Physical Therapy
Recreation and Leisure Studies
 Recreation Management
 Therapeutic Recreation
Speech-Language Pathology and Audiology

Certificate of Advanced Graduate Study

Counseling

Educational Administration

Language Acquisition and Language Disorders

Rehabilitation Administration

Rehabilitation Counseling

Doctor of Education

Leadership: Administration and Supervision in:

Cooperative Education Administration

Higher Education Administration

Pupil Personnel Administration

Rehabilitation Administration

School Administration

Student Personnel Administration

The Practice of Counseling Psychology

Nondegree Programs (Teacher Preparation)

Moderate Special Needs

Secondary Education

Severe Special Needs

Graduate School of Business Administration

Master of Business Administration

Full-time MBA

Part-time MBA

High-Tech MBA

Executive MBA

Management Internship

Graduate School of Computer Science

Master of Science in Computer Science

Graduate School of Criminal Justice

Master of Science in Criminal Justice

Criminal Justice

**Forensic Chemistry

**Interdisciplinary degree program



Graduate School of Engineering

Master of Science

Chemical Engineering
Civil Engineering
Electrical Engineering
Engineering Management
Industrial Engineering
Information Systems
Mechanical Engineering

*Transportation

Engineer Degree

Electrical Engineer
Industrial Engineer
Mechanical Engineer

Doctor of Engineering

Chemical Engineering

Doctor of Philosophy

Chemical Engineering
Civil Engineering
Electrical Engineering
Industrial Engineering and Information Systems
Mechanical Engineering

Graduate School of Pharmacy and Allied Health Professions

Master of Science

Biomedical Science
*Clinical Chemistry
Hospital Pharmacy
Medical Laboratory Science
Medicinal Chemistry
Pharmacology
Master of Health Professions

Doctor of Pharmacy

Biomedical Science

Doctor of Philosophy

Biomedical Science

*Interdisciplinary program

PROFESSIONAL SCHOOLS AND DEGREES

Graduate School of Professional Accounting

Master of Science

School of Law

Juris Doctor

About Northeastern University

Among the nation's largest private universities, Northeastern distinguishes itself not only by its immutable dedication to excellence in research and study but also by its dedication to discovering community educational needs and meeting them. The University has not attempted to duplicate the programs of other institutions but has sought to pioneer new areas of educational service from its beginning in 1898.

Northeastern's roots can be found in the Evening Institute for Young Men, founded in Boston in 1898. Classes in law were offered at a reasonable cost during the evening for those who worked during the day. The first evening law school in Boston quickly expanded to include other disciplines and soon added an innovative daytime program, which offered opportunities to "earn while you learn." By the time Northeastern was incorporated as a university in 1922, the school had committed itself to "cooperative education by day, adult education in the evening."

A half-century later, Northeastern had become a large, comprehensive university, with ten undergraduate colleges, nine graduate and professional schools, numerous suburban campuses, and an extensive research division. Incorporated as a privately endowed, nonsectarian institution of higher learning under the General Laws of Massachusetts, Northeastern, like other private universities, is governed by a Board of Trustees, elected by and from the Northeastern University Corporation, which is composed of about 200 distinguished business and professional men and women across the country.

Northeastern University has developed a national reputation as the leader in cooperative education. The Cooperative Plan of Education, initiated by the College of Engineering in 1909 and subsequently adopted by the other colleges of the University, enables students to alternate periods of work and study. This educational method offers students an opportunity to gain valuable practical experience as an integral part of their education and also provides the means by which they may contribute substantially to the financing of their education. Begun at the full-time undergraduate level, the plan has been extended to

the graduate level in engineering, business administration, law, professional accounting, and criminal justice.

In the field of adult education, the University offers full- and part-time graduate-degree programs that are specifically designed to meet the needs and interests of adults who wish to further their education. The University's eight graduate and professional schools—Arts and Sciences, Boston-Bouvé College of Human Development Professions, Business Administration, Criminal Justice, Engineering, Pharmacy, and Allied Health Professions, Professional Accounting, and Law—offer programs leading to master's and doctoral degrees. Lincoln College and University College offer part-time undergraduate programs leading to associate's and bachelor's degrees (in humanities, business administration, and technical disciplines), while the Division of Continuing Education offers nondegree courses.

Northeastern University is an exciting and dynamic university in which to pursue your academic aspirations. It is also a modern, urban institution dedicated to meeting the practical challenges of the times and the community.

Research at Northeastern University

Research and scholarship have always been an integral part of Northeastern University's activities, promoting the intellectual growth and development that help to ensure the University's continued ability to provide quality education to its students.

The first formally organized research group at Northeastern University was the Bureau of Business Research, established in 1939 to study business principles and practices. Thereafter, research efforts on campus increased so rapidly that in 1954 a Faculty Committee on Development and Coordination of Research was established to help unify and provide direction to scholarly activity at Northeastern. From an initial grant of \$10,000 awarded to the Physics Department by the Office of Naval Research in 1945, sponsorship for University research efforts has grown to involve millions of dollars each year.

Responsibility for fostering and coordinating the development of research at Northeastern currently resides with the Vice President for Research, who is assisted by the University Council on Research and Scholarship and the Office of Sponsored Programs. A recently introduced newsletter entitled *Re:Search* brings information about the research and scholarly efforts of Northeastern's faculty and students to the University community and the general public.

Faculty and graduate students receive funding for their research from a variety of sources, including the National Institutes of Health, the National Science Foundation, the National Endowment for the Humanities, IBM, Dow Chemical, and the Mellon Foundation. The University also contributes to many research projects through its own Research and Scholarship Development Fund.

Northeastern University has numerous distinguished faculty members, many of whom have received prestigious awards, including Sloan Scholarships, Guggenheim Fellowships, and National Institutes of Health Research Awards. Faculty members lecture the world over. In addition, many faculty members serve as U.S. government consultants and participate on a variety of national and international committees.

Current research activities span almost every academic field and include laboratory projects, theoretical studies, and technological applications. Research is under way in the areas of business, physical and biological sciences, social sciences, humanities, allied health professions, and engineering. Student participation in these activities can take place as part of regular academic programs, in the form of specially designed independent studies, or through cooperative work assignments. Research involvement is actively encouraged and is limited only by the student's own motivation and curiosity.

University Institutes and Research Centers

Northeastern University has also established a number of interdisciplinary institutes and research centers to provide administrative support and coordination for research efforts in key areas. The following are among those included in this category:

- Cooperative Education Research Center
- Center for Applied Social Research
- Arts and Sciences Center for Asian Studies
- Institute for Chemical Analysis, Applications, and Forensic Science
- Electron Microscopy Center
- Arts and Sciences Humanities Center
- Center for International Higher Education Documentation (CIHED)
- Center for Labor Market Studies
- Marine Science and Maritime Studies Center
- Center for Medical Manpower Studies
- Arts and Sciences Center for Urban Studies
- Center for Urban and Regional Economic Studies
- Academic Computer Services
- Office of Sponsored Programs

Scholarly Journals

Several scholarly journals originate from Northeastern. These include *Studies in American Fiction*; *The New England Quarterly*; *The Scriblerian*; *Journal of Sport and Social Issues*; *Tennessee Williams Review*; *Romanticism Past and Present*; and *Health Values: Achieving High-Level Wellness*.



Northeastern in Boston

Historically, the city of Boston has played a pioneering role in American education. Today it has one of the largest and most diverse student populations in the country. Within a twenty-five-mile radius of Northeastern University's campus are over fifty degree-granting institutions.

As a graduate student at Northeastern, you will discover that part of the adventure of studying in Boston is exploring the cultural, educational, historical, and recreational offerings of the city. Northeastern is very much an urban university, and Boston is one of its richest resources.

Boston is both a city of tradition and a city of change. Centuries-old meetinghouses are located beside striking contemporary office buildings and large-scale civic projects. This diversity is reflected in the cultural life of the city as well. Within a short distance of the campus are numerous renowned cultural centers, such as Symphony Hall, the Museum of Fine Arts, the Isabella Stewart Gardner Museum, Horticultural Hall, and the Boston Public Library. Theater in Boston includes everything from pre-Broadway tryouts to experimental and college productions.

For those interested in sports, the Boston Red Sox, Boston Celtics, Boston Bruins, and New England Patriots play all their home games in and around the Boston area.

The University is adjacent to the Fenway, a spacious and naturalistic park designed near the turn of the last century by Frederick Law Olmsted, the world-famous landscape architect, that includes a beautiful rose garden and paths used extensively by Northeastern joggers.

Cape Cod and the North Shore are easily reached by car or public transportation for swimming, surfing, and boating. The scenic areas of northern New England are accessible for skiing, hiking, and mountain climbing.

Boston provides its student population with a stimulating environment in which to learn and grow. In turn, the considerable influence of its universities and colleges and their student populations provides Boston with a young, vibrant, and exciting ambience, quite possibly unequaled anywhere else.

Financial Information

Financial Obligations

Tuition and Fees

Tuition rates and all fees are subject to revision by the President and the Board of Trustees at any time and may change annually. Current tuition rates and fees are listed in the brochure *Graduate School Expenses*, which may be obtained from the Bursar's Office or the Graduate School office.

Tuition statements are mailed to students by the Bursar's Office and are payable by cash or check to Northeastern University on or before the date specified.

Refunds

Tuition refunds will be granted only on the basis of the date appearing on the official withdrawal form filed by the student. Nonattendance does not constitute official withdrawal. Questions regarding refunds should be discussed with the Bursar's Office.

Refunds will be granted in accordance with the following schedule:

<i>Official Withdrawal Filed Within:</i>	<i>Percentage of Tuition Refunded</i>
First week of quarter	100
Second week of quarter	75
Third week of quarter	50
Fourth week of quarter	25

Financial Assistance

Northeastern University offers graduate students a variety of means for obtaining financial assistance. In addition to various types of assistantships awarded by the individual graduate schools, the Office of Financial Aid administers several forms of financial aid. A limited number of fellowships are also available to minority students through the African-American Institute, and each year there are part-time residence hall staff positions available.

Office of Financial Aid

The Office of Financial Aid offers several types of assistance to graduate students. All awards are based on financial need. Since the majority of these awards are sponsored by the federal government, the amount of aid granted is dependent upon the amount of funds allocated to Northeastern University each year.

In order to meet application deadlines for financial aid, students may have to apply for aid before they have been offered admission to the Graduate School. However, only those students who are accepted will be reviewed for financial aid. In addition, the University only awards financial aid to students who are U.S. citizens and permanent residents of the United States. Students who are studying in the United States on student visas are not eligible for federal assistance.

Northeastern University is a participant in the Graduate and Professional School Financial Aid Service (GAPSFAS). All applicants for financial aid must file a GAPSFAS form in order to be considered.

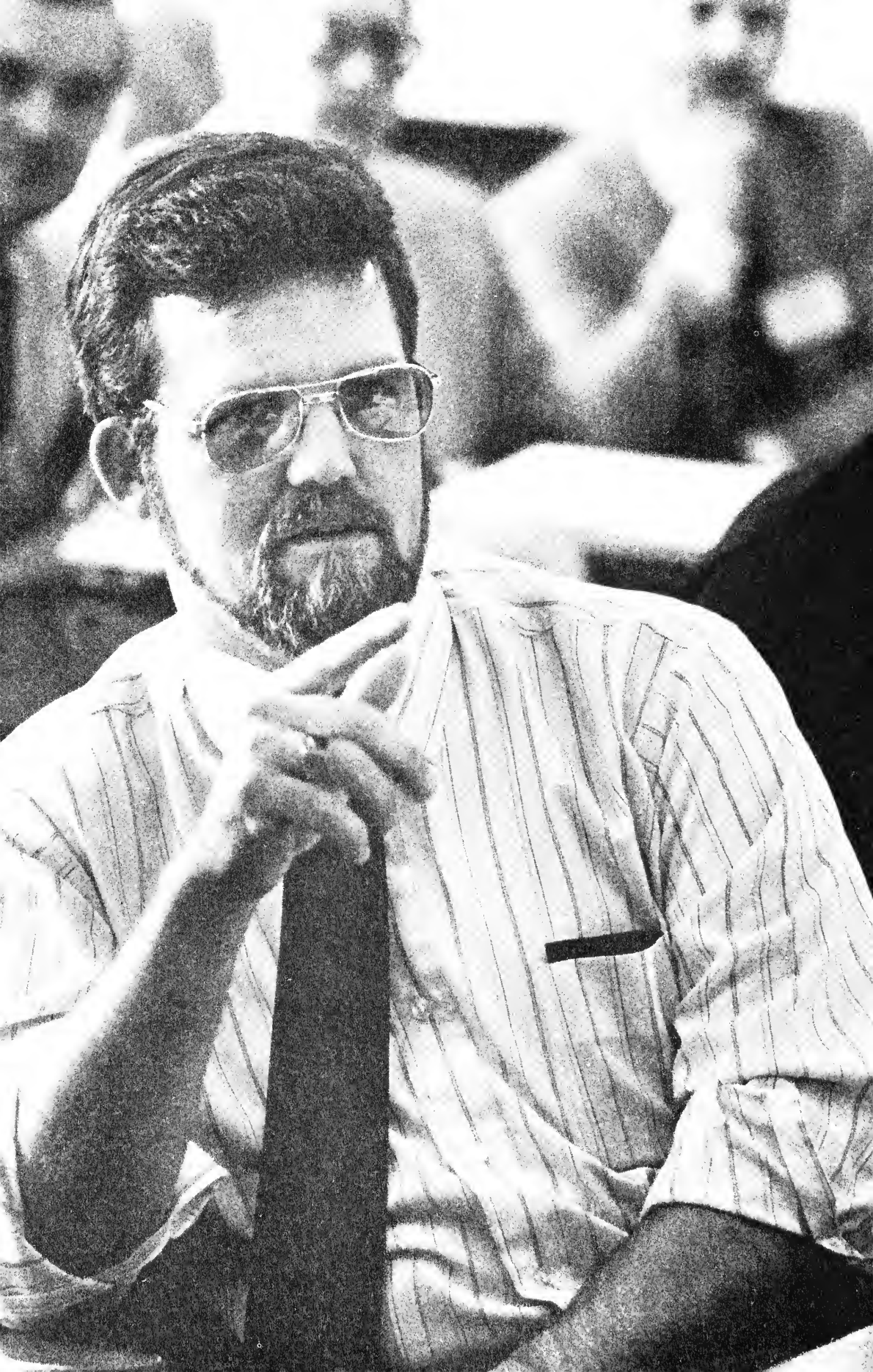
All sections of the GAPSFAS form, including the parents' section, must be completed and sent to GAPSFAS, Box 2614, Princeton, New Jersey 08540. In addition to the GAPSFAS form, Northeastern also requires a Graduate School Financial Aid Application and a Financial Aid Transcript. All of these forms are available at the Office of Financial Aid, 254 Richards Hall.

National Direct Student Loan

This program is available to full-time graduate students who show a high level of financial need. Graduate students may borrow up to \$12,000 during the course of their entire educational careers. Repayment and interest do not begin until six months after the student ceases to carry at least a half-time academic load. Repayment may be extended over a ten-year period with an interest rate of five percent per annum. No payments are required for up to three years while a borrower is serving in the Armed Forces, Peace Corps or VISTA or is working as a full-time volunteer for a tax-exempt charitable organization.

College Work-Study Program

This program is available to full-time graduate students who show financial need. It is designed to give students an opportunity to earn as much as \$5 per hour working in jobs on or off campus in public or private nonprofit organizations. This program is administered solely by the Office of Financial Aid and should not be confused with the University's Cooperative Education Program.



Guaranteed Student Loan Program

Under this program, students whose families have adjusted gross incomes under \$30,000 may borrow money for educational expenses from banks or other private lending institutions. Students whose families have adjusted gross incomes that exceed \$30,000 may also borrow if they can show financial need in accordance with guidelines established by the U.S. Department of Education. Students must be enrolled on at least a half-time basis to be eligible for these loans. Terms and conditions of these loans vary from state to state. Repayment, which begins six months after the student ceases to carry at least a half-time load, may be extended for as long as ten years. The interest rate during repayment is nine percent per annum. No payments are required for up to three years while the borrower is serving in the Armed Forces, Peace Corps, or VISTA or is working as a full-time volunteer for a tax-exempt charitable organization. Information and applications are available from lenders, state guarantee agencies, and regional offices of the U.S. Department of Education. Massachusetts residents may contact the Office of Financial Aid for more information.

N.B.: This information is current as of the date of this publication. All federal programs are subject to change. Please check with the Office of Financial Aid to determine the status of financial aid programs at the time you plan to enroll.

Scholarships

Northeastern University Minority Fellowships

These fellowships are to assist a limited number of students accepted for full-time study in the graduate schools of the University. The awards, which offer remission of tuition, are made to students who demonstrate superior academic achievement and are competitive within their graduate school. Applications may be obtained from the Graduate School office.

Martin Luther King, Jr., Scholarship

A limited number of full-time Martin Luther King, Jr., Scholarships are available. These scholarships pay the recipient's full tuition and fees during the course of satisfactory graduate work. Further information and applications are available at the African-American Institute, Northeastern University, 40 Leon Street, Boston, Massachusetts 02115.

Robert A. Feer Scholarship

This scholarship is awarded yearly to the outstanding candidate for the master of arts degree in history. The scholarship was established in memory of Professor Robert A. Feer, who was a member of the Department of History from 1963 to 1970.

Assistantships

Northeastern University has available a limited number of assistantships for full-time students who are working toward their master's or doctoral degree. Candidacy for these awards may be established by completing the appropriate application obtained in the Graduate School office. Those students already enrolled should consult their advisers.

Appointments to assistantships are ordinarily announced no later than April 15 for the following academic year or summer. Appointments are for a maximum of three quarters and are not automatically renewed. Students who hold assistantships are expected to devote full time to their studies and the duties of the award.

Teaching Assistantships

A limited number of teaching assistantships are available to graduate students, offering them the opportunity to receive a tuition scholarship. A stipend is also given with the award in return for academic assistance in the department in areas directly related to the teaching function. Holders of such awards are expected to devote half their time to the duties of the award and the balance to coursework.

Graduate Administrative Assistantships

Some departments offer graduate administrative assistantships, which provide students the opportunity to receive a tuition scholarship. A stipend is also given with the award in return for half their time spent in assisting the department with non-teaching, administrative duties. These assistantships are available on a limited basis.

Research Assistantships

Several departments offer a limited number of research assistantships, giving students an opportunity to receive a tuition scholarship. A stipend is also given in return for research done in the department. Certain of these grants require half-time work on research in the department, with the remaining time devoted to coursework. Others provide for full-time work on research used for a thesis or dissertation.

Northeastern University Tuition Assistantships (NUTA)

A limited number of tuition assistantships are available, offering remission of tuition to full-time students assisting ten hours a week in the administrative work of the department. These awards are normally given to students in the first year of graduate work. Students should note that the value of the tuition received via this type of assistantship has been defined by the

Internal Revenue Service as taxable. Applications may be obtained from the Graduate School office.

Acceptance Conditions

Northeastern University, which is a member of the Council of Graduate Schools of the United States, subscribes to the following resolution of the Council:

Acceptance of an offer of financial aid (such as a graduate scholarship, fellowship, traineeship, or assistantship) for the next academic year by an actual or prospective graduate student completes an agreement which both student and graduate school expect to honor. In those instances in which the student accepts the offer before April 15 and subsequently desires to withdraw, the student may submit in writing a resignation of the appointment at any time through April 15. However, an acceptance given or left in force after April 15 commits the student not to accept another offer without first obtaining a written release from the institution to which a commitment has been made. Similarly, an offer by an institution after April 15 is conditional on presentation by the student of the written release from any previously accepted offer.

Residence Hall Staff Positions

A limited number of residence staff positions in housing facilities are available each year. Appointments carry a minimum compensation of room and board. Further information may be obtained from the Office of University Housing, 104–106 Ell Building.

Outside Grants

Frequently, the Dean's Office receives announcements of available funds for research sponsored by organizations outside the University, such as the National Science Foundation and the National Endowment for the Humanities. For further information contact the Dean's Office, 400 Meserve Hall, 437-3980.

The federal aid programs listed above are available to citizens and permanent residents of the United States. All financial aid is available on a limited basis.



The Graduate School of Arts and Sciences

General Regulations

The general regulations of the Graduate School, which follow, are minimal requirements shared by the several degree programs. The student is advised to consult the appropriate departmental section for a statement of additional requirements in specific programs.

Ten departments in the College of Arts and Sciences offer work at the graduate level. The master of arts degree may be earned in economics, English, history, political science, psychology, sociology, and social anthropology. The master of science degree is awarded in biology, chemistry, economic policy and planning, mathematics, and physics. The Master of Science in Health Science, the Master of Technical and Professional Writing, and the Master of Public Administration degrees are also offered. In addition, students can earn the certificate of advanced graduate study in the program of advanced literary study.

The doctor of philosophy degree is available in biology, chemistry, economics, mathematics, physics, psychology, and sociology.

Several degree options are offered in the interdisciplinary areas of law, policy, and society and of clinical and forensic chemistry.

Application

Completed applications, recommendation forms, and complete official transcripts should be sent directly to the appropriate academic department. Applicants should make the necessary arrangements, where required, to have official reports of the Graduate Record Examination (GRE) and the Miller Analogies Test forwarded to the office of the Graduate School of Arts and Sciences. (Students interested in forensic or clinical chemistry should direct applications to the College of Criminal Justice or to the Graduate School of Pharmacy and Allied Health Professions.)

Prospective students should consult the departmental sections for individual program deadlines for application. While the deadlines vary and exceptions are occasionally made, necessary supporting documents must be on file with the departmental office at least eight weeks before the date of registration

for the quarter in which the student wishes to begin his/her graduate work. However, students desiring assistantships should be aware that priority in these awards is generally given to applications submitted before March 15. Again, departments may have earlier or later deadlines. Please refer to the appropriate departmental section for complete information.

All applicants to the Graduate School are strongly urged to take both the aptitude and advanced portions of the GRE. These tests are presently required by the departments of Biology, English, History, and Psychology. The Psychology Department also requires that the results of the Miller Analogies Test be submitted. The Sociology/Anthropology Department requires the aptitude test scores (verbal, quantitative, and analytical) on the GRE. (In special cases, Miller Analogies Test scores may be accepted in lieu of GRE scores. Please consult the department.)

Applications for the GRE can be obtained by writing to:

Educational Testing Service
Box 955
Princeton, New Jersey 08540

At least two letters of recommendation are required by all departments; Biology, Math, Political Science, Psychology, and Sociology/Anthropology require three letters. Candidates for financial awards should indicate their candidacy to those supplying references.

Though candidates for admission to Arts and Sciences graduate programs apply through the individual programs, the final decision concerning admissions is made by the Office of the Dean of the College of Arts and Sciences.

International Student Application

International students are responsible for submitting all supporting materials required by the department, as listed above and in the specific departmental section. In addition, each student is required to have a Declaration and Certification of Finances (DCF) form, as well as evidence of English proficiency on file with the Graduate School office at least ten weeks before the date of registration for the quarter in which the student expects to begin a scholastic program.

Evidence of English proficiency may consist of (1) satisfactory results on the Test of English as a Foreign Language (TOEFL); (2) proof of a minimum of four years of study culminating in the receipt of a degree in an undergraduate institution abroad where the medium of instruction is English; or (3) proof of completion of a degree program at an American college or university.

Applications for TOEFL may be obtained by writing to:

Educational Testing Service
Box 899
Princeton, New Jersey, 08540

Students without adequate evidence of English proficiency may be admitted conditionally and evaluated by the English Language Center prior to registration. Students who do not demonstrate adequate English proficiency will be required to enroll in the English Language Center Intensive Language Course for at least one quarter before enrolling in a full academic program. Such students may be permitted, with approval of the Director of the English Language Center and of the academic adviser, to enroll in academic coursework at the same time as they participate in Intensive English.

Admission

To be considered for graduate work, an applicant must submit a complete official transcript, indicating the award of a bachelor's degree from a recognized institution, and provide evidence of being able to pursue creditably a program of graduate study in the chosen field. Acceptance to the Graduate School is granted upon recommendation of the departmental graduate committee after a review of the completed application.

In addition to the above, international students must have submitted evidence of financial support. Those who have not submitted acceptable evidence may not be granted a visa and will not be permitted to register.

International Teaching Assistant Orientation

All first-year international teaching assistants will participate in a week-long intensive orientation prior to the beginning of the fall quarter. This orientation is intended to provide international teaching assistants with the opportunity to sharpen their speaking and presentation skills, as well as to introduce them to the culture of the American classroom. This orientation and the weekly seminars that are offered throughout the fall quarter are mandatory for first-year international teaching assistants.

Student Classification

Regular Student

Those students who are admitted to a degree program.

Provisional Student

Students whose academic records do not qualify them for acceptance as regular students. Provisional students must obtain a B (3.0) average in the first twelve quarter hours of study or meet specifically delineated departmental requirements to qualify for acceptance to a degree program.

Special Student

Students with a bachelor's degree who are not matriculated in a degree program. All those interested in this status should inquire with the Graduate School office regarding application procedures and deadlines. Acceptance as a special student is in no way related to admission to a departmental degree program. However, those special students subsequently admitted to a degree program may petition through their departments to the Director of the Graduate School to apply the first twelve quarter hours of credit earned as special students toward degree requirements. Special students are expected to maintain a B (3.0) average in the first twelve quarter hours of study.

Doctoral Student

Students admitted to a doctoral program.

Formal Doctoral Degree Candidate

Doctoral students who have completed forty quarter hours of acceptable graduate work, have passed the departmental qualifying examination, and have been certified by the Graduate School of Arts and Sciences.

Registration

Students must register within the dates and times listed on the school calendar. The place of registration will be announced quarterly. Students who fail to register will not earn credit or a grade for the course(s) in question.

Students must obtain adviser approval of course selections each quarter. In addition, once adviser approval has been obtained, their registration materials must be stamped with the official Graduate School of Arts and Sciences stamp by a representative of the students' department or of the office of the Graduate School. The Registrar will not process any registrations submitted without the stamp.

Residence

All work for advanced degrees must be registered for and completed at the University, unless approval has been obtained from the Director of the Graduate School for work taken elsewhere. Procedures for obtaining such approval are described in the section of this catalog on transfer credit.

Programs of Study

The study load for full-time students is usually three or four courses per quarter. Part-time students are not permitted to enroll in more than two courses per quarter without formal approval of the departmental chairperson or a designate. Courses in most fields are offered in both the afternoon and evening.



$$f(x) = f(x_0) + f'(x_0)(x - x_0) + \frac{f''(x_0)}{2!}(x - x_0)^2 + \frac{f'''(x_0)}{3!}(x - x_0)^3 + \dots$$

$$(1+x)^n = 1 + nx + \frac{n(n-1)}{2!}x^2 + \frac{n(n-1)(n-2)}{3!}x^3 + \dots$$

$$\frac{d}{dx} x^2 = 2x$$

Grading System

The student’s performance in graduate courses will be graded according to the following numerical equivalents:

- A (4.0) These grades are given to those students whose performance in the course has been of very high graduate caliber.
- A – (3.667)
- B+ (3.333) These grades are given to those students whose performance in the course has been at a satisfactory level.
- B (3.0)
- B – (2.667)
- C+ (2.333) These grades are given to those students whose performance in the course is not at the level expected in graduate work.
- C (2.0)
- C – (1.667)
- F (0) This grade is given to those students whose performance in the course is unsatisfactory.

In addition, the following letter designations are used:

- I Incomplete without quality designation.
This grade may be given to those students who fail to complete the work of the course.
- L Audit without credit.
- S Satisfactory without quality designation.
- U Unsatisfactory without quality designation.
- W Withdrawal after the fifth week of classes.

The I grade will be changed to a letter grade when the deficiency that led to the I is corrected to the satisfaction of and in the manner prescribed by the instructor in the course. The period for clearing such a grade will be restricted to one calendar year from the date of its first being recorded on the student’s permanent record.

Students who wish to audit a course must indicate this to the instructor. While no credit will be given for an audit, audits do appear on the student’s transcript. Registration changes from an audit to a graded status in a course may not be made after the first day of classes.

Individual faculty members may choose not to use the plus and minus designations. If they elect to use the whole letters only, they must announce this policy to the class at the beginning of the quarter.

Class Hours and Credits

All credits are entered as quarter hours. A quarter hour of credit is equivalent to three fourths of a semester hour of credit.

Continuity of Program	Students are expected to maintain continuous progress toward their intended degrees. Any student who does not attend Northeastern for a period of one year may be required to apply for readmission.
Withdrawals	<p>In order to withdraw from a course, a student must fill out an official withdrawal form obtained at the Registrar's Office or at the Suburban Campus Office. Withdrawals may be made through the ninth week of the quarter. However, withdrawals that are made after the fifth week of the quarter will be recorded with a W grade on the student's transcript.</p> <p>Students will be withdrawn as of the date on which the form is received by the Registrar's Office. Ceasing to attend a class or simply notifying the instructor of intention to withdraw does not constitute an official withdrawal.</p>
Changes in Requirements	The continuing development of the Graduate School forces frequent revision of curricula. When no hardship is imposed on the student because of changes, and when the facilities of the school permit, the student is expected to meet the requirements of the most recent catalog. However, if it can be demonstrated to the Director of the Graduate School that doing so does impose a substantial hardship, the requirements in the bulletin of the year in which the student matriculated will be applicable.
Application for the Diploma	Application for the diploma is made by filing a commencement card with the Registrar's Office. Even though all other degree requirements may have been met, the commencement card must be filed on or before the applicable date listed in the calendar in order to assure that the degree will be conferred in the desired year. It is, of course, the student's responsibility to make sure that degree requirements have been met.

The Master's Degree

Academic Requirements	<p>A candidate for the master's degree must complete a minimum of forty quarter hours of graduate-level coursework and such other study as may be required by the department in which the student is registered.</p> <p>To qualify for the degree, a cumulative average of 3.000, equivalent to a grade of B, must be obtained. This average will be calculated quarterly by the Graduate School according to the grading system as specified on page 29, and will exclude any transfer credits or repeated courses. A student who does not</p>
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maintain a 3.000 cumulative average for two consecutive quarters or is otherwise not making satisfactory progress toward degree requirements, as specified by the individual department, may be terminated at the discretion of the graduate program committee.

Not more than two courses, or six quarter hours of credit, whichever is greater, may be repeated in order to satisfy the requirements for the degree. Only such repeats will be counted in calculating the cumulative average requirement.

Within the above limitations, a required course for which a grade of F is received must be repeated with a grade of C or better and may be repeated only once. Similarly, a student may elect to repeat a required course in which a C has been received. Elective courses in which an F has been received may be repeated once to obtain a C or better.

Comprehensive Examination

A final written or oral comprehensive examination is required in some programs. This examination will be given by the department concerned at least two weeks before the commencement at which the degree is expected.

Thesis

Theses are required in some programs and should demonstrate the individual's capacity to execute independent work based on original material.

Theses must be approved by the departmental graduate committee, and, in cases in which a grade is required, must receive a grade of B (3.0) or better to be accepted.

Students who have not completed their thesis after having registered for the specified number of thesis credits must register and pay for Master's Thesis Continuation each subsequent quarter until the thesis is complete. Master's Thesis Continuation will carry no credit but will be recorded on the students' transcripts with the appropriate grade (S or U) for each quarter of registration.

Language Requirement

An examination to show evidence of ability in one or more foreign languages is required in some graduate programs. This knowledge is established by an examination, which will be administered by the appropriate department or the office of the Graduate School at least twice yearly.

Transfer Credit

Students should petition, in writing, through their departments to the Director of the Graduate School of Arts and Sciences for all transfer credit. A copy of an official transcript should be attached to the petition. A maximum of twelve quarter hours of credit obtained at another institution may be accepted toward

the master's degree, provided that the credits transferred consist of A or B grades in graduate-level courses, are in the candidate's field, have been earned at a recognized institution, and have not been used toward any other degree. Transfer credit grades may not be used for the purpose of obtaining the academic average necessary for completion of the degree requirements.

Time Limitation

Course credits earned in the program of graduate study or accepted by transfer are valid for a maximum of seven years, unless an extension is granted by the Director of the Graduate School of Arts and Sciences. Students should petition, in writing, through their departments to the Director of the Graduate School for such extensions.

The Doctor of Philosophy Degree

The doctor of philosophy degree is awarded to candidates who give evidence of high attainment and research ability in their major fields. Specific degree requirements are administered by a committee in charge of the degree program. This committee may be a departmental graduate committee or the committee of the Graduate School, depending upon the nature of the program. It is the responsibility of the chairperson of the committee to certify to the Graduate School office the completion of each requirement for each candidate.

Admission

Each degree program has an established admission procedure for students starting their doctoral work at Northeastern University. Please consult the appropriate departmental section for further details.

**Residence
Requirement**

A candidate for the doctor of philosophy degree must spend the equivalent of at least one academic year in residence at the University as a full-time graduate student. The committee of each degree program specifies the method by which the residence requirement is satisfied.

Degree Candidacy

Formal degree candidacy is established when students have completed forty quarter hours of acceptable graduate work (where applicable), have passed the qualifying examination, and in all cases have been certified by the Graduate School of Arts and Sciences.

Qualifying Examination	Students must pass a qualifying examination within time limits set by the committee of each degree program.
Comprehensive Examination	Degree programs may require a comprehensive examination during the time in which a student is a degree candidate.
Course Requirements	The minimum course requirement of forty quarter hours constitutes the same work normally required for a master's degree. Course requirements beyond this minimum in each doctoral program are specified by the committee in charge of the doctoral program.
Dissertation	Each doctoral student must complete a dissertation that embodies the results of extended research and makes an original contribution to the field. This work should give evidence of the candidate's ability to carry out independent investigation and interpret in a logical manner the results of the research. The method of approval of the dissertation is established by the committee in charge of the degree program.
Language Requirement	The foreign language requirement is established by the committee in charge of each degree program.
Final Oral Examination	<p>The final oral examination will be on the subject matter of the doctoral dissertation and on important developments in the field of the dissertation. Other fields may be included if recommended by the examining committee.</p> <p>This examination will be taken after completion of all other degree requirements and must be held at least two weeks prior to the commencement at which the degree is to be awarded.</p>
Transfer Credit	Students should petition, in writing, through their departments to the Director of the Graduate School of Arts and Sciences for all transfer credit. A copy of an official transcript should be attached to the petition.
Time Limitation	After the establishment of degree candidacy, a maximum of five years will be allowed for the completion of degree requirements.
Registration	All students must register for coursework or dissertation as approved by their advisers or the departmental registration officers. After the first registration for doctoral work, registration must be continuous unless withdrawal is allowed by the committee in charge of the degree program and certified by the Graduate School of Arts and Sciences. For each quarter beyond

the first three quarters that a doctoral candidate is working on the dissertation, he/she should register for Doctoral Continuation, which is listed in the course listing for each doctoral degree-granting department. Students must be registered for dissertation during the quarter in which they take the final oral examination.

Interdisciplinary Programs

Some graduate students may wish to pursue doctoral programs that involve substantial work in two or more departments. To meet this need, an interdisciplinary program may be established that corresponds in scope and depth to doctoral standards but does not agree exactly with the individual departmental regulations. For such possibilities, the option discussed below is available.

Admission

Application for admission to interdisciplinary doctoral study consists of the submission of a carefully thought out written proposal describing the areas of proposed study and research, as well as the qualifying and comprehensive examination system to be used. The proposal may be a part of the initial application for admission to graduate study at Northeastern University, or it may be submitted by a graduate student already enrolled. In either case, the admission materials should be prepared in consultation with an academic adviser. The proposal may be directed to a doctoral degree-granting department or to the Director of the Graduate School, who forwards it to the appropriate department. In either case, admission to interdisciplinary doctoral study requires favorable recommendation by the sponsoring doctoral degree-granting department and approval by authorized representatives of the graduate study committees of the departments appropriate to the disciplines covered by the applicant's proposal. The sponsoring department becomes the student's registration base.

Formation of Interdisciplinary Committee

A student who has been accepted for interdisciplinary study must obtain the consent of an adviser who will direct the doctoral dissertation. This adviser, who may or may not be a member of the registration department, will be chairperson of the interdisciplinary committee for this student. A second member will be appointed from the registration department by its chairperson. These two members will obtain one or more additional members or request the Director of the Graduate School to do

so. At least two departments must be represented on the committee, and a majority of the committee must come from doctoral degree-granting departments. The chairperson of the registration department will notify the Director of the Graduate School of the membership of the committees as soon as arrangements are complete.

Duties of Interdisciplinary Committee

A member of the interdisciplinary committee who is also a member of the registration department will serve as the registration officer to approve the course registration for the student. A copy of the approved course registration must also be filed with the other committee members and with the graduate study committee of the registration department.

The interdisciplinary committee will be responsible for the administration of the qualifying examination, language examination, and comprehensive examination and approval of the dissertation. This committee must also certify to the registration department the completion of the requirements for the award of the doctoral degree. The interdisciplinary committee is also responsible for a periodic report to the registration department concerning the student's progress and must attain approval from that department for any changes in the approved program.

The interdisciplinary committee must assure that the student's program represents standards comparable to those of the registration department and that the program is not so broad as to have inadequate depth in any area.

The student's program may be reviewed at any time by the Director of the Graduate School to determine whether objectives of the program are being met.



Fields of Study

The departmental sections that follow describe the program offerings and degree requirements. Additionally, a list of courses available to a student during the typical period of attendance required to obtain a degree is provided. The quarter in which a specific course will be offered will be found in the course announcement available in May for the summer quarter and in June for the following academic year.

Biology

The primary objective of the graduate program in biology is to enable the student to acquire a fundamental orientation in biology and to achieve some level of mastery of a chosen area of specialization. Students who reach this objective should be prepared to formulate and solve problems of fundamental importance to biology.

Professors

David C. Wharton, PhD, *Pennsylvania State University*,
Chairperson

Francis D. Crisley, PhD, *University of Pittsburgh*

Janis Z. Gabliks, DDS, *Baltic University*; PhD, *Rutgers University*

Charles A. Meszoely, PhD, *Boston University*

M. Patricia Morse, PhD, *University of New Hampshire*

Nathan W. Riser, PhD, *Stanford University*

Fred A. Rosenberg, PhD, *Rutgers University*

Ernest Ruber, PhD, *Rutgers University*

Phyllis R. Strauss, PhD, *Rockefeller University*

Associate Professors

Joseph L. Ayers, Jr., PhD, *University of California, Santa Cruz*

Kostia Bergman, PhD, *California Institute of Technology*

Charles H. Ellis, Jr., PhD, *Johns Hopkins University*

Gwilym Jones, PhD, *Indiana State University*

Helen Lambert, PhD, *University of New Hampshire*

Joseph V. Pearincott, PhD, *Fordham University*

Daniel Scheirer, PhD, *Pennsylvania State University*

Henry O. Werntz, PhD, *Yale University*

Assistant Professors

John W. Bodnar, PhD, *Oregon State University*

Donald P. Cheney, PhD, *University of South Florida*

Richard L. Marsh, PhD, *University of Michigan*

Duncan Munro, PhD, *University of Michigan*

Jacqueline M. Piret, PhD, *Massachusetts Institute of Technology*

Susan Powers-Lee, PhD, *University of California, Berkeley*

Christina Reyero, PhD, *Complutense University of Madrid*

Michael E. Salvucci, PhD, *University of Florida*

Graduate Program

Research

This department offers programs of concentration in animal physiology, biochemistry, botany, cell biology, ecology, marine biology, microbiology, and zoology. Research in these areas is actively pursued by departmental faculty. The department is well equipped with remodeled, air-conditioned laboratories. Other notable facilities controlled by or available for use by the department include the Electron Microscopy Center, a large greenhouse on a suburban campus, computer terminals linked to a VAX-11/780, the Marine Science and Maritime Studies Center at Nahant (with a running seawater system and a research vessel), animal and aquarium rooms, an herbarium, controlled-environment rooms and chambers, cell culture facilities, and a wide variety of preparative and analytical instruments, such as spectrophotometers, centrifuges, ultracentrifuges, isotope counters, HPLC, an electron paramagnetic resonance spectrometer, a gas chromatograph, fluorescent microscopes, and electrophysiological devices.

Procedures for Admission

All application forms and catalogs should be requested from the Biology Department office. Requests for information about programs should be directed to the program graduate director. There are three programs in biology: master of science in biology (full- or part-time); master of science in health science (full- or part-time); and doctor of philosophy (full-time only).

Financial Aid

General Policies

All full-time students enrolled in the Biology Department's master's or doctoral degree programs are eligible to be considered for financial aid. A full-time master's student is defined as one enrolled in courses worth approximately seven quarter hours of graduate credit per quarter and, in any case, one who will complete twenty quarter hours of credit within one year.

As noted in the section of this catalog on financial assistance, all students who hold assistantships and research fellowships are expected to devote full time to their studies and the duties of the award.

As a general departmental policy, a master's degree student is eligible for not more than two years of financial aid, and a doctoral student is eligible for not more than three years. After the first year, reappointments are considered on the basis of academic performance, and on professor and student evaluations from the assigned classes.

Application for Financial Aid

For consideration for financial aid, eligible students of any departmental program must include in their application materials the Graduate Record Examination (GRE) scores, including the Advanced Test Scores in Biology. Awards are made on the basis of academic record, GRE scores, consideration of the awards available, and the candidate's experience and skills for teaching or research in the various fields. *Financial aid is available on a limited basis; therefore, early application is desirable.*

The Master of Science in Biology

The master of science in biology is a research-oriented degree that is offered on a part-time or full-time basis. The department offers the opportunity for concentrations in both coursework and research in areas of study that include animal physiology, biochemistry, botany, cell biology, ecology, marine biology, microbiology, and zoology.

Admission

In addition to the requirements of the Graduate School of Arts and Sciences, applicants should have a background that includes one year each of organic chemistry, physics, and mathematics, and courses equivalent to the six one-quarter courses (four quarter hours each) of the biology undergraduate core curriculum (BIO 1103–BIO 1261). Students with deficiencies should remove them during the first twenty quarter hours of graduate work.

Transcripts of academic work and three letters of recommendation are required. GRE scores, including the Advanced Test Scores in Biology, must be submitted. Admission decisions are made by the Biology Department's subcommittee on admissions.

Provisional and Regular Status

If a student has a less than optimum undergraduate average or low GRE scores, the graduate admissions subcommittee may admit the student with a provisional status. Under normal circumstances a student in this category is not eligible for financial aid. A provisional student must have a B average at the end of twelve quarter hours of graduate credit. At that time he/she is given regular status (if maintaining a B average) or is terminated from the program. A regular student is expected to maintain a B average but does not necessarily come under review at the end of the twelve quarter hours and is eligible for all forms of financial aid.

Deficiencies

Deficiencies can be filled by (1) taking course equivalents in the College of Arts and Sciences; (2) taking University College (evening) courses; (3) taking equivalent undergraduate lecture-laboratory courses at another four-year institution. Neither of the latter two options will receive graduate credit; however, graduate credit may be awarded under the first option if the courses taken are the graduate equivalent, as described in the following section.

Equivalents in University College of Arts and Sciences Courses

Arts and Sciences		University College
BIO 1211	Environmental and Population Biology	BIO 4224, BIO 4225, BIO 4226
BIO 1260	Genetics and Developmental Biology	BIO 4235, BIO 4236, BIO 4237
BIO 1261	Cell Biology	BIO 4246, BIO 4247, BIO 4248

It is strongly recommended that students take the regular Northeastern University day undergraduate courses and/or their two-quarter hour graduate credit equivalents (listed below) to remedy their deficiencies:

BIO 3510	Environmental and Population Biology	(2 QH)
BIO 3560	Genetics and Developmental Biology	(2 QH)
BIO 3561	Cell Biology	(2 QH)

Academic Requirements

Forty quarter hours of academic work is required to complete the ms in biology. Of this, twenty quarter hours must be work in Biology Department graduate courses (BIO 1300, BIO 1400, BIO 3500, and BIO 3600 courses, excluding BIO 3690, BIO 3691, BIO 3697, and BIO 3698). In addition, four quarter hours of seminars (BIO 3690) and six quarter hours of research (BIO 3697 ms thesis or BIO 3698 ms literature dissertation) are required. Of the remaining ten quarter hours required, four quarter hours may be additional research credits (BIO 3691, BIO 3697, BIO 3698) or all may be Biology Department graduate courses (excluding BIO 3690) or approved courses from other departments within the University. Any transfer credit is included within these ten quarter hours.

Note, in any case, that a maximum of ten quarter hours of research courses is applicable to the ms degree, which must include a minimum of six quarter hours of BIO 3697 or BIO 3698.

A cumulative average of 3.000 for all graduate work is required for the award of the ms degree. All regulations of the Graduate School of Arts and Sciences apply with regard to maintenance of academic standing.

Research

Either six quarter hours of ms thesis (BIO 3697) or six quarter hours of ms literature dissertation (BIO 3698), both of which culminate in a written report, is required for the ms in biology.

MS Thesis

The ms thesis involves a program of laboratory or field research leading to the writing and oral defense of the thesis itself. The candidate works under the direction of a member of the graduate faculty and a committee of two other biology graduate faculty members.

MS Literature Dissertation

The ms literature dissertation involves a program of extensive literature research leading to a comprehensive written review of an important biological problem and an oral examination. This study is undertaken with a member of the biology graduate faculty and a committee of two other biology graduate faculty.

Master of Science in Health Sciences

The MSHS degree is offered to provide a more flexible set of options for students interested in health sciences. Students may enroll on a full- or part-time basis. The specific curriculum of studies by MSHS degree students is determined by consultation with the graduate director of the program and/or the adviser, within the general guidelines specified under Academic Requirements below.

Admission

In addition to the requirements of the Graduate School of Arts and Sciences, applicants should have a background that includes one year each of organic chemistry, physics, and mathematics, and courses equivalent to the six one-quarter courses (four quarter hours each) of the biology undergraduate core curriculum (BIO 1103–BIO 1261). Students with deficiencies should remove them during the first twenty quarter hours of graduate work. In the MSHS program, some flexibility is allowed in the way in which these deficiencies may be removed (or waived), with the approval of the graduate director of the program and the department's graduate committee.

Candidates are required to submit transcripts of academic work and three letters of recommendation.

Academic Requirements

For the MSHS, the candidate must complete forty quarter hours of academic work. Of this work, twenty quarter hours must be coursework in Biology Department graduate courses (BIO 3000 courses, excluding BIO 3690, BIO 3691, BIO 3697, and BIO 3698). In addition, four seminars (BIO 3690) are required. Two of these seminars, with prior approval of the graduate director



of the program, may be graduate seminars offered by other departments in the University. The remaining sixteen quarter hours of graduate credit may be Biology Department graduate courses, up to six quarter hours of research courses (including BIO 3692), or approved courses from other departments in the University. A maximum of twelve quarter hours of transfer credit is included within these sixteen quarter hours.

A cumulative average of 3.000 for all graduate work is required for award of the MSHS. The regulations of the Graduate School apply with regard to maintenance of academic standing.

Final Comprehensive Exam

In the final year of graduate study, the MSHS candidate must successfully complete a written final comprehensive examination in a major and minor area, unless the research option (described below) is exercised. This examination is designed to test the candidate's proficiency in the areas of study. If it is not successfully completed, one reexamination is permitted. Candidates should notify the program director six months before they intend to take the examination.

Research Option

A research option (MS thesis or literature dissertation) is available, and all rules as stated in the MS in Biology section apply. A successful oral defense of thesis or literature dissertation may substitute for the final comprehensive exam.

The Doctor of Philosophy

Admission

Only applicants who have a master's degree or its equivalent at entry may be considered for direct admission to the doctoral program. Those who do not may be considered only after admission to the master's program and after satisfactory completion of thirty quarter hours of graduate study, which must include completion of some research. All students must submit transcripts, three letters of reference, and GRE scores, including the Advanced Test scores in Biology. In addition, a student must have a written agreement on the part of a graduate faculty member who will serve as the thesis adviser.

A candidate for the MS degree may apply for direct transfer to the PhD program after having completed thirty quarter hours of graduate study in the MS program. In addition to filing a formal application for admission, a candidate for transfer must successfully complete the oral PhD qualifying examination before transfer can be completed. If such a student fails the qualifying examination, he/she may not transfer to the PhD program.

before receiving the MS degree, but such failure will have no effect on his/her status in the MS program. After completing the MS degree, such a student is still eligible to apply to be considered for regular admission to the PhD program.

A PhD candidate in good standing who has successfully completed transfer by the procedure in the paragraph above may, after completing forty quarter hours of course and research credit with at least the required minimum cumulative average, apply to receive the MS degree without submitting a thesis.

**Residence
Requirement**

After admittance to the doctoral program, the student may satisfy the residence requirement by one year of full-time graduate work or by two years of half-time graduate work.

**Qualifying
Examination**

The qualifying examination is an oral examination intended to evaluate the student's knowledge of the basic principles inherent in the various areas of biology as represented in the core curriculum and to ascertain the student's readiness to continue in the research program in the area chosen. Students *must* take the qualifying examination by the end of three quarters at Northeastern University.

**Academic
Requirement**

Course requirements for PhD candidates are variable, depending on recommendations of the major adviser and examination committees, but, in any event, a cumulative average of 3.000 for all graduate work is required.

**Teaching
Requirement**

A PhD candidate is required to spend one year as a teaching assistant in the department. If the candidate wishes this requirement to be waived, he/she must petition the department graduate committee and provide evidence of equivalent teaching experience.

**Language
Requirement**

Candidates must establish evidence of an ability to read and translate biological literature in two foreign languages. The primary languages for biology are French, German, and Russian. Students will be expected to choose from these languages for their examinations; however, another language may be substituted when there is considerable literature in the area of interest.

One of the language requirements may be fulfilled by completion of two courses in the general principles of statistics, biometry, and/or computer programming.

**PhD Comprehensive
Examination**

The comprehensive examination may be taken by the PhD candidate after passing at least one of the language requirements

or its equivalent. The questions on the examination are designed to test whether the student's knowledge of concepts and methods of the area is sufficiently comprehensive and profound to enable him/her to enter on a career of fruitful teaching and research. The examination in the major field will delineate the candidate's potential to teach advanced courses, while the minor examination will show competency to teach undergraduate courses in that field.

Thesis

The thesis is the most important part of the PhD degree and must be an original and independent scientific study. The thesis adviser and student will work closely to evolve the problem and arrange for a PhD thesis committee. The minimum number of members for a PhD committee is five. One member must be an acknowledged expert from outside the University.

Special-Student Status

Special students are not matriculated in a degree program, and acceptance as a special student is not related to admission into a departmental degree program. However, those special students who are subsequently admitted into a degree program may petition through the MSHS graduate director to the Director of the Graduate School to apply the *first twelve* quarter hours of graduate credit earned as a special student toward degree requirements. Special students are expected to maintain a B average in the first twelve quarter hours of study. The MSHS graduate director is the overseer for special students.

Further information on admission procedures and standards can be obtained from the Graduate School of Arts and Sciences or the MSHS graduate director.

Interdisciplinary Programs

Admission

Application and credentials for admission to interdisciplinary programs involving the Biology Department, where this department is clearly the department of registration, as described in the general section on interdisciplinary programs, should be submitted as described under Admission in the section The Doctor of Philosophy for biology. The interdisciplinary committee will consist of at least five members. The composition of this committee will be determined by mutual consent between

the departments involved, but it will have at least three members from the Biology Department if the dissertation adviser is from this department. Upon admission, suitable interdisciplinary course requirements will be determined by the interdisciplinary committee.

Qualifying Examination

Students accepted into the program will normally be expected to complete the qualifying examination by the end of three quarters at Northeastern University. At least five areas of study will be covered by the qualifying examination, which must include at least three oral examinations chosen by the candidate from the following areas: biochemistry, botany, ecology, genetics, microbiology, physiology, and zoology. The remaining components of the examination will be specified and evaluated by the other participating department. With the exceptions of the procedures for admission and examinations for qualification, the remaining requirements and procedures are as specified under The Doctor of Philosophy for biology.

Course Listings

The following is a listing of all departmental course offerings. Please refer to the *1984–1985 Graduate Schools Course Descriptions* for course descriptions and relevant prerequisites.

Most undergraduate biology courses in the series designated BIO 1300–1400 are available for graduate credit with adviser approval. Please consult the undergraduate or other appropriate bulletin for course details. The following courses are so considered:

Course No.	Course Name	Credit
BIO 1311	Evolution	4 QH
BIO 1320	General Microbiology	5 QH
BIO 1328	The Microbial World	4 QH
BIO 1329	Marine & Fresh Water Microbiology I	2 QH
BIO 1330	Marine Botany	4 QH
BIO 1341	Vertebrate Zoology	4 QH
BIO 1347	Embryology	5 QH
BIO 1348	Animal Histology	4 QH
BIO 1351	Comparative Vertebrate Anatomy	5 QH
BIO 1370	Marine Invertebrate Zoology	5 QH
BIO 1401	Histological Technique	3 QH
BIO 1402	Principles of Systematics	2 QH
BIO 1411	Tropical Terrestrial Ecosystems	3 QH
BIO 1420	Microbial Physiology	4 QH
BIO 1460	Current Concepts in Cell Biology	4 QH
BIO 1465	Introductory Immunology	3 QH
BIO 1466	Introductory Immunology Laboratory	2 QH
BIO 1470	Coastal Biology I	4 QH

Course No.	Course Name	Credit
BIO 1471	Coastal Biology II	4 QH
BIO 1472	Coastal Biology III	4 QH
BIO 1477	Biology of Corals	5 QH
BIO 1478	Biology of Fishes	5 QH
BIO 1479	Adaptations of Aquatic Organisms	4 QH
BIO 1258	Vertebrate Physiology 1	4 QH
BIO 1259	Vertebrate Physiology 2	4 QH
BIO 1421	Medical Virology	3 QH
BIO 1422	Medical Virology Laboratory	2 QH
BIO 1427	Medical Microbiology	3 QH
BIO 1428	Medical Microbiology Laboratory	2 QH
BIO 1429	Marine & Fresh Water Microbiology II	2 QH
BIO 1430	Introduction to Plant Physiology	4 QH
BIO 1431	Lower Plants	4 QH
BIO 1432	Higher Plants	4 QH
BIO 1437	Structural Botany	4 QH
BIO 1438	Flora of New England	4 QH
BIO 1439	Economic Botany	4 QH
BIO 1440	Advanced Invertebrate Zoology	4 QH
BIO 1441	Parasitology	4 QH
BIO 1442	Vertebrate Paleontology	4 QH
BIO 1447	Herpetology	4 QH
BIO 1448	Mammalogy	5 QH
BIO 1451	Comparative Animal Physiology	4 QH
BIO 1452	Comparative Neurobiology	4 QH

The following are graduate courses:

BIO 3509	Principles of Systematics	2 QH
BIO 3510	Environmental & Population Biology	2 QH
BIO 3511	Aquatic Ecology	3 QH
BIO 3512	River Ecology Laboratory	3 QH
BIO 3517	Lake Ecology Laboratory	3 QH
BIO 3518	Ecology of Salt Marshes	3 QH
BIO 3519	Ecology of Rocky Shores	4 QH
BIO 3520	Environmental Microbiology	4 QH
BIO 3521	Food Microbiology	3 QH
BIO 3522	Food Microbiology Laboratory	2 QH
BIO 3527	Animal Virology	3 QH
BIO 3528	Animal Virology Laboratory	2 QH
BIO 3530	Plant Nutrition & Metabolism	4 QH
BIO 3531	Plant Growth & Reproduction	4 QH
BIO 3537	Marine Algae	4 QH
BIO 3538	Plant Morphogenesis	4 QH
BIO 3547	Biomechanics I, Theory	4 QH
BIO 3548	Biomechanics II, Application	4 QH
BIO 3549	The Physiology and Biomechanics of Animal Activity	4 QH
BIO 3550	Cardiovascular Physiology	3 QH
BIO 3551	Cardiovascular Physiology Laboratory	1 QH
BIO 3552	Osmotic & Ionic Regulation	2 QH
BIO 3557	Environmental Physiology	3 QH
BIO 3558	Vertebrate Endocrinology	3 QH
BIO 3559	Animal Nutrition	2 QH
BIO 3560	Genetics & Developmental Biology	2 QH
BIO 3561	Cell Physiology & Biochemistry	2 QH
BIO 3562	General Biochemistry	3 QH
BIO 3567	General Biochemistry Laboratory	3 QH
BIO 3568	Microbial Biochemistry	4 QH
BIO 3569	Microbial Genetics	3 QH
BIO 3570	Lower Invertebrates	4 QH

Course No.	Course Name	Credit
BIO 3571	Coelomate Invertebrates	4 QH
BIO 3572	Biology of Meiofauna	2 QH
BIO 3577	Malacology	4 QH
BIO 3601	Biological Electron Microscopy	4 QH
BIO 3607	Advanced Developmental Biology	3 QH
BIO 3608	Advanced Developmental Biology Laboratory	2 QH
BIO 3609	Cellular Aspects of Development	3 QH
BIO 3610	Human Ecology	4 QH
BIO 3617	Environmental Law	2 QH
BIO 3620	Industrial Microbiology	3 QH
BIO 3621	Industrial Microbiology Laboratory	2 QH
BIO 3650	Experimental Mammalian Physiology	4 QH
BIO 3652	Comparative Neurobiology	3 QH
BIO 3657	Neurophysiology Laboratory	2 QH
BIO 3658	Nervous Control of Homeostatic Functions	3 QH
BIO 3659	Renal Physiology	2 QH
BIO 3660	Cell Biophysics & Biochemistry	5 QH
BIO 3661	Human Genetics	3 QH
BIO 3667	Biochemistry Laboratory Rotation I	3 QH
BIO 3668	Biochemistry Laboratory Rotation II	3 QH
BIO 3669	Biochemistry Laboratory Rotation III	3 QH
BIO 3670	Developmental Biology of Marine Invertebrates	5 QH
BIO 3671	General Helminthology	3 QH
BIO 3672	Ichthyology	4 QH
BIO 3690	Graduate Seminar	1 QH
BIO 3691	Special Topics in Biology	variable
BIO 3692	Special Investigation in Biology	variable
BIO 3697	MS Thesis	0 QH
BIO 3698	MS Literature Dissertation	0 QH
BIO 3699	PhD Dissertation	0 QH
BIO 3798	Master's Thesis Continuation	0 QH
BIO 3799	Doctoral Dissertation Continuation	0 QH

Chemistry

The Chemistry Department offers programs leading to the MS and PhD degrees. The requirements for the MS degree can be met either via a part-time program involving only coursework or via a full-time program involving coursework plus a research thesis. Proposals to obtain the master's degree on bases varying from these must be approved by the department. The PhD requires a program of coursework plus a PhD research thesis. The department's areas of concentration are in analytical, inorganic, organic, and physical chemistry. There are well-funded theoretical and experimental research programs in all of these areas, under the direction of individual faculty members.

The MS and PhD degrees prepare candidates for research, administration, and managerial work in science and technology in industrial, governmental, and academic institutions. A key feature of the department's research philosophy is the importance placed on individual interactions between faculty research directors and students in the research groups. The department's teaching at the graduate level is characterized by constant application of and reference to the primary literature in chemistry, physics, biology, and ancillary fields.

Professors

Philip W. LeQuesne, PhD, *University of Auckland, Chairperson*

Geoffrey Davies, PhD, *Birmingham University*

Bill C. Giessen, Dr Sci Nat, *University of Gottingen*

Arthur M. Halpern, PhD, *Northeastern University*

Barry L. Karger, PhD, *Cornell University*

William M. Reiff, PhD, *Syracuse University*

Robert A. Shepard, PhD, *Yale University*

Alfred Viola, PhD, *University of Maryland*

Professors Jointly Appointed

John L. Neumeyer, PhD, *University of Wisconsin (College of Pharmacy and Allied Health Professions)*

Robert F. Raffauf, PhD, *University of Minnesota (College of Pharmacy and Allied Health Professions)*

Associate Professors

David A. Forsyth, PhD, *University of California, Berkeley*

David M. Howell, PhD, *University of Michigan*

Conrad M. Jankowski, PhD, *State University of Iowa, Clinical Chemistry*

Elmer E. Jones, PhD, *Washington University*

John L. Roebber, PhD, *University of California, Berkeley, Executive Officer*

Paul Vouros, PhD, *Massachusetts Institute of Technology*

Robert N. Wiener, PhD, *University of Pennsylvania*

Assistant Professors

Lee A. Flippin, PhD, *Colorado University*

Thomas R. Gilbert, PhD, *Massachusetts Institute of Technology*

Michael E. Kellman, PhD, *University of Chicago*

Kay D. Onan, PhD, *Duke University*

Mary J. Ondrechen, PhD, *Northwestern University*

John A. Wronka, PhD, *University of Delaware*

Lawrence D. Ziegler, PhD, *Cornell University*

Research

In the analytical area, the chief focuses are on separation science, mass spectroscopy, and trace element analysis. In separation science, HPLC theory and practice, separation of chiral solutes, studies on proteins, peptides, forensic analysis, and development of methodologies are major thrusts. In mass spectroscopy, combined HPLC/MS and GC-MS technology, MS/MS methodology, and studies of oxidation of steroid hormones by these techniques are current emphases. Trace element analysis methods are developed for materials such as industrial wastes, petroleum, liquefied coal products, and biological and environmental samples. Fundamental studies in plasma emission spectroscopy are also under way.

In the inorganic area, the solid-state research group emphasizes synthesis, the structures and properties of amorphous and glassy metals, and the catalytic properties of amorphous metals and alloys. The Mössbauer spectroscopy of a variety of metallic elements and their compounds is being studied. There are programs on catalytic oxygenation involving transition metal complexes, including stabilization of air-sensitive liquefied coals.

In organic chemistry, the physical organic group is concerned with isotope effects and nuclear magnetic resonance (NMR) spectroscopy as tools to investigate reactive intermediates and is also concerned with mechanisms of pericyclic reactions. The synthetic-natural products area has groups working on the isolation, structural determination, and synthesis of bioactive

natural products and on the design of synthetic methodology appropriate for a wide variety of applications.

Molecular structures and conformation of organic and inorganic compounds are studied by x-ray crystallography.

The physical chemistry group has experimental interests concentrated in the areas of spectroscopy, photochemistry, and photophysics. In the theoretical area, interest is centered on the theory of electron transfer and on the modeling of excited atomic and molecular states, using group theoretical techniques.

Admission

In addition to the admission requirements listed on page 24, an applicant must have completed a full year of undergraduate organic chemistry, physical chemistry, analytical chemistry, calculus, and physics. Admission policy favors those who have taken courses beyond the above minimum.

These admission requirements may be modified to accommodate applicants who have taken fewer courses than indicated above but who have outstanding records and a strong interest in chemical or interdisciplinary studies. See also the description of interdisciplinary programs.

Program Planning

Prospective students and current students should discuss their programs with a departmental adviser. The departmental advisers may be reached by calling 437-2822 and would welcome discussion of curriculum matters and program planning.

The Master of Science Degree

Thesis Program

This program may only be pursued on a full-time basis while in residence except when special departmental approval has been obtained. It consists of a minimum of forty quarter hours of graduate credit in courses, seminars, and research and a thesis based on this research. Each student is required to take at least twenty-four quarter hours of credit in graduate chemistry courses numbered between CHM 3521 and CHM 3699. Up to four quarter hours of graduate courses in physics or mathematics may be substituted. At least eight of these courses must be taken in the first year of residence, with a minimum quality point average of 2.50 in the best eight courses taken in order to continue in the program. (For students who wish to be considered for the PhD degree, a quality point average of 3.0, in these eight courses is required, and no more than five of these courses may be in any one area of concentration.) A cumulative

average of 3.0 is required in all courses that have a CHM prefix and in the graduate courses in physics and mathematics that are included in the minimum. In agreement with general Graduate School regulations, a cumulative average of 3.000 is required for the entire program, and two courses or six quarter hours of credit, whichever is greater, may be repeated.

The student's program must include four quarter hours of credit in each of three out of the four areas of chemistry, selected from the following core courses:

- Four quarter hours of credit in analytical chemistry, chosen from CHM 3521, CHM 3523, CHM 3525, and CHM 3527.
- Four quarter hours of credit in inorganic chemistry, normally in the CHM 3541 and CHM 3542 sequence.
- Four quarter hours of credit in organic chemistry, normally in the CHM 3561 and CHM 3562 sequence.
- Four quarter hours of credit in physical chemistry, in either the CHM 3581 and CHM 3582 sequence *or* the CHM 3591 and CHM 3592 sequence. Note that CHM 3581 and CHM 3591 by themselves are not sufficient.

In cases of unusual preparation, more advanced courses may be substituted within the given subdiscipline. Approval for any substitution should be obtained from the departmental graduate academic standing committee before any such courses are taken.

A minimum of six quarter hours of credit, but no more than fourteen, may be assigned to CHM 3810, Research and Thesis for MS degree. Each student is required to attend the appropriate section of seminar (CHM 3800, CHM 3801, CHM 3802, CHM 3803) in each quarter of residence and is expected to conduct one seminar in each academic year of residence, for which one quarter hour of credit is assigned, up to the maximum of two quarter hours of credit.

Students in the thesis program are eligible to apply for financial support through the Department of Chemistry.

Nonthesis Program

This program may be pursued on a part-time basis. It consists of forty quarter hours of credit in graduate coursework, of which a minimum of thirty-two quarter hours of credit must be taken in chemistry graduate courses numbered between CHM 3521 and CHM 3699. The remainder of the program consists of any graduate courses for which the student has the necessary prerequisites. Only those graduate courses that constitute the first forty quarter hours of credit will be considered by the department. In agreement with general Graduate School regulations, two courses or six quarter hours of credit, whichever is

greater, may be repeated, and a cumulative average of 3.0 is required.

The student's program must include the following core courses in the four areas of chemistry:

- Four quarter hours of credit in analytical chemistry, chosen from CHM 3521, CHM 3523, CHM 3525, and CHM 3527.
- Four quarter hours of credit in inorganic chemistry, normally in the CHM 3541 and CHM 3542 sequence.
- Four quarter hours of credit in organic chemistry, normally in the CHM 3561 and CHM 3562 sequence.
- Four quarter hours of credit in physical chemistry, in either the CHM 3581 and CHM 3582 sequence *or* the CHM 3591 and CHM 3592 sequence. Note that CHM 3581 and CHM 3591 by themselves are not sufficient.

In cases of unusual preparation, more advanced courses may be substituted within the given subdiscipline. Approval for any substitution should be obtained from the departmental graduate academic standing committee before any such courses are taken.

Students in the nonthesis program are not eligible for financial support through the Department of Chemistry.

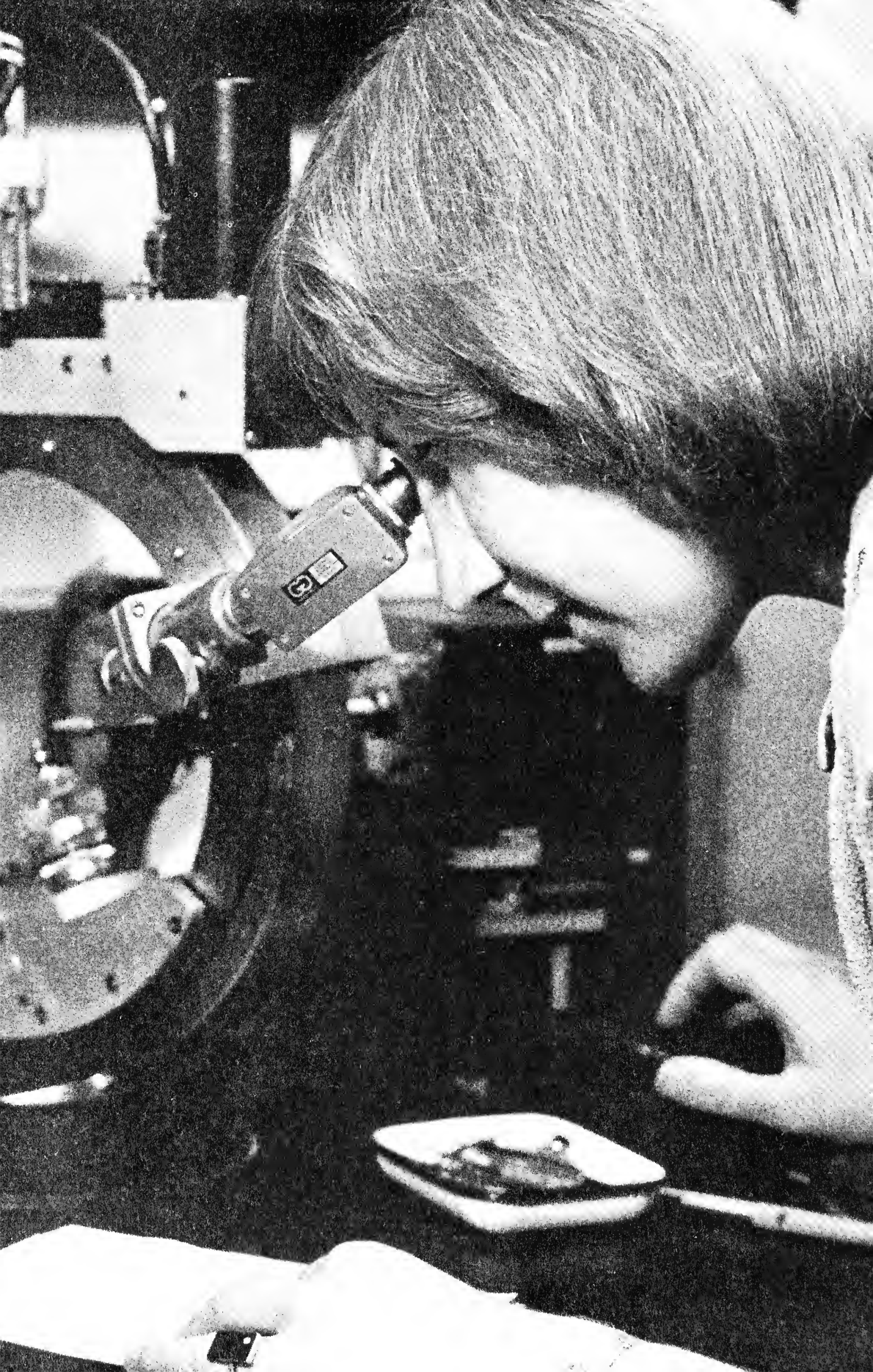
Doctor of Philosophy Degree

The doctoral program in chemistry may be pursued only in residence. The additional requirements beyond those of the master's degree are designed to provide the doctoral candidate an opportunity to demonstrate superior proficiency in original research, including technical reading ability in a foreign language and familiarity with current advances in one of the main areas of chemistry.

Residence Requirement

The residence requirement is satisfied after one year of full-time graduate work or two years of half-time work. If a student holds a teaching assistantship that occupies one half of the student's time, the residence requirement is discharged at half rate. Other arrangements require faculty approval. If a candidate has a research fellowship that supports the research for the doctoral dissertation, the residence requirement is discharged at full rate. Normally, the equivalent of two years of work after establishment of doctoral candidacy is necessary to complete research.

Degree Candidacy	Degree candidacy is established in accordance with the general Graduate School regulations.
Qualifying Examinations	<p>Qualifying examinations are offered in the fields of analytical, inorganic, organic, and physical chemistry. There are eight examinations offered each year in each field. Students are required to pass four of these examinations in their declared field of study.</p> <p>A student is eligible to take the qualifying examination if:</p> <ol style="list-style-type: none"> 1. The student has entered with a bachelor's degree and has achieved a 3.0 quality point average in eight courses taken in the first year of residence, as described in the ms Thesis Program above. <i>No more than five of these courses may be within any one area of concentration if the student wishes to be in the PhD program.</i> Two of the eight graduate courses may be in physics or mathematics; the remaining courses must be numbered between CHM 3521 and CHM 3699. 2. The student has been admitted to the doctoral program with an awarded master's degree. 3. The student is a part-time student who has petitioned the department after having completed at least sixteen quarter hours of credit in graduate courses, including fulfillment of three of the four distributional requirements listed for the part-time program. A 3.000 cumulative average is required for all courses taken. <p>Students in category 1 must pass the qualifying examinations by July 1 of their second year of residence. Students in category 2 must pass the qualifying examinations by July 1 of their first year of residence. Students in category 3 will have the conditions set at the time their petition is approved.</p>
Course Requirements	A candidate is normally required to complete some coursework beyond the forty-quarter-hour minimum. The number and nature of these courses are individually determined for each candidate in consultation with the dissertation adviser.
Dissertation	In most cases, arrangements for a dissertation adviser will have been made before the completion of the qualifying examinations. If not, such arrangements must be made as soon as possible after degree candidacy has been established. The dissertation adviser directs the research for the dissertation and serves as chairperson of the dissertation committee, which must approve the dissertation before the degree may be conferred.



Language Requirements Candidates must demonstrate proficiency in a foreign language, as specified by the departmental graduate committee in accordance with the general Graduate School regulations. French, German, and Russian are the acceptable foreign languages. Normally, proficiency is demonstrated by taking examinations administered by the Chemistry Department.

Final Oral Examination This examination will be held in accordance with the Graduate School regulations.

Areas of Advanced Study and Research

Analytical Chemistry The general areas of active research in analytical chemistry include separation science; the application of analytical methods to a wide range of problems; the application of mass spectrometry to organic analytes in mixtures; and forensic, clinical, and oceanographic analysis.

Inorganic Chemistry Research in solid state emphasizes the synthesis and properties of amorphous metals and alloys; preparation of new catalytic materials; and Mössbauer studies of a wide variety of metal-containing species. In the solution area, catalytic properties of the coordination complexes of transition metals are a focus of activity.

Organic Chemistry Research in the organic chemistry division encompasses the areas of organic synthesis, synthetic methodology, organic reaction mechanisms, carbocationic species, natural products, phytochemistry, and chemical ecology.

Physical Chemistry The physical chemistry division has active research programs in the areas of photophysics, fluorescence spectroscopy, solution and gas phase photochemistry, molecular spectroscopy, physical solid-state chemistry including x-ray diffraction, small molecule x-ray crystallography, and theoretical studies, especially of electron transfer and of atomic and molecular excited states.

Research Facilities and Equipment The main facilities of the department are located in Hurtig Hall. Substantial additional space and equipment are available in the Barnett Institute of Chemical Analysis and Materials Science in Mugar Hall; in the Forsyth Building; and at the University's

Marine Science and Maritime Studies Center at Nahant. Major research equipment includes:

- Electron spin, nuclear magnetic resonance, and mass spectrometers
- Liquid and gas chromatographs and atomic absorption spectrometers
- X-ray diffractometers, an electron microscope, and thermal analyzers and calorimeters
- Gouy and Faraday magnetic balances and a vibrating sample magnetometer
- Vacuum ultraviolet, photoionization, ultraviolet, visible, and infrared spectrometers
- Flash photolysis, laser photolysis, and photochemical equipment
- Mössbauer spectrometers and low temperature facilities
- Fluorescence emission and lifetime apparatus and a stopped-flow apparatus
- Electroanalytical, polarographic, and coulometric equipment

INTERDISCIPLINARY AND OTHER GRADUATE CHEMISTRY PROGRAMS

Some graduate students wish to pursue doctoral programs that involve substantial work in two or more departments. The Chemistry Department has served as the registration department for a number of students engaged in such areas. The details of establishing such a program tailored to a student's individual needs are explained on page 34 of this catalog.

Interdisciplinary PhD in Forensic Chemistry

This program is designed to help prepare students for research and leadership positions in forensic laboratories. It is offered in conjunction with the College of Criminal Justice and the Barnett Institute of Chemical Analysis and Materials Science. Details are given on page 62. Application material, can be obtained by writing to:

Graduate Program in Forensic Chemistry
College of Criminal Justice
144 Knowles-Volpe Hall
Northeastern University
360 Huntington Avenue
Boston, Massachusetts 02115

Master of Science in Forensic Chemistry

This program is available on a full-time or part-time basis, with courses offered primarily during the evening hours. Details are given on page 62. Application materials can be obtained by writing to:

Graduate Program in Forensic Chemistry
College of Criminal Justice
144 Knowles-Volpe Hall
Northeastern University
360 Huntington Avenue
Boston, Massachusetts 02115

Master of Science in Clinical Chemistry

A part-time interdisciplinary program offered in cooperation with the College of Pharmacy and Allied Health Professions, the master of science in clinical chemistry program is designed to help prepare students for employment in clinical laboratories. Students must apply for this program through the College of Pharmacy and Allied Health Professions. Details are given below.

Master of Science in Clinical Chemistry (Part-Time Program)

Admission

In addition to the admissions requirements listed on page 24, the applicant must have completed a baccalaureate program in biology, chemistry, medical technology, or pharmacy. Undergraduate requirements to have been completed for this program are a minimum of two quarters of organic chemistry and two quarters of analytical chemistry (each with a laboratory or its equivalent), two quarters of human physiology, and two quarters of physical chemistry. An individual who has deficiencies in any of these areas may take appropriate evening courses (for undergraduate credit only) at Northeastern University concurrently with those graduate courses that do not require the deficient prerequisites. The appropriate evening courses offered at University College of Northeastern University are Analytical Chemistry (ICHM 4221–ICHM 4223 or ICHM 4224); Organic Chemistry (ICHM 4261–ICHM 4263); Physical Chemistry (ICHM 4381–ICHM 4383); and Human Anatomy and Physiology (IBIO 4175–IBIO 4177). Equivalent courses from this University or other universities will be accepted.

This is an interdisciplinary program. Applications should be directed to the Graduate School of Pharmacy and Allied Health Professions.

Program

The master of science in clinical chemistry program is interdisciplinary, offered in cooperation with Northeastern's College of Pharmacy and Allied Health Professions. Forty quarter hours of academic coursework is required. In addition, students must have at least one year of acceptable clinical laboratory experience prior to completion of academic degree requirements. Students in good standing in the program who lack the required experience may apply for the course FMLS 1552, Clinical Chemistry Applied Study, which carries five quarter hours of undergraduate credit, two of which may be applied toward the master's degree. This course is offered through the College of Pharmacy and Allied Health Professions at one of the nearby affiliated hospitals, providing students the opportunity to earn three months' experience in a clinical setting. Students should consult the Medical Laboratory Science (MLS) Clinical Coordinator regarding prerequisite courses and the details for taking this course, which must be arranged at least six months in advance of enrollment in the course. Individuals who have completed this course may then be able to obtain subsequent employment in this field and thereby satisfy the one year's experience requirement.

The program is available on a part-time basis, with courses offered primarily during the evening hours. Courses are scheduled in the fall, winter, spring, and summer quarters. The following core courses are required in the program:

Course No.	Course Name	Credit
CMTH 3221	Biostatistics	2 QH
CCHM 3430	Modern Methods of Analysis	3 QH
CCHM 3521	Analytical Separations	2 QH
FPMC 3301	Clinical Chemistry I	2 QH
FPMC 3302	Clinical Chemistry II	2 QH
FPMC 3651	Seminar and Report in Clinical Chemistry I	2 QH
FRSC 3301	Radioisotopes in Biological Systems	2 QH
FMLS 3301	Functions of Human Systems	2 QH
FINT 3101	Biochemistry I	2 QH
CINT 3102	Biochemistry II	2 QH
FINT 3103	Biochemistry III	2 QH
		<hr/>
		23 QH

Twelve additional quarter hours of credit must be taken from the following elective core courses:

CCHM 3523	Electroanalytical Chemistry	2 QH
CCHM 3531	Special Topics in Analytical Chemistry I	2 QH
CCHM 3532	Special Topics in Analytical Chemistry II	2 QH
CCHM 3528	Computers in Chemistry	3 QH
CBIO 3561	Human Genetics	2 QH
FPMC 3652	Seminar and Report in Clinical Chemistry II	2 QH
FPMC 3653	Seminar and Report in Clinical Chemistry III	2 QH
FPMC 3101	Advanced Medicinal Chemistry I	2 QH
FPMC 3102	Advanced Medicinal Chemistry II	2 QH
FPMC 3103	Advanced Medicinal Chemistry III	2 QH

Course No.	Course Name	Credit
FPMC 3104	Advanced Medicinal Chemistry IV	2 QH
FPCL 3101	Concepts in Pharmacology I	2 QH
FPCL 3102	Concepts in Pharmacology II	2 QH
FTOX 3101	Concepts in Toxicology I	2 QH
FPCL 3161	Drug Metabolism	2 QH
FMLS 3302	Pathophysiology I	2 QH
FMLS 3303	Pathophysiology II	2 QH
FMLS 3365	Medical Laboratory Management I	2 QH
FMLS 3366	Medical Laboratory Management II	2 QH
FMLS 3321	Hematology I—Disorders of the Erythrocytes	2 QH
FMLS 3338	Immunobiology	2 QH
FMLS 3322	Hematology II—Disorders of the Leukocytes	2 QH
FMLS 3304	Cellular Pathology I	2 QH
FMLS 3305	Cellular Pathology II	2 QH
FMLS 3341	Advanced Clinical Microbiology I	2 QH
FMLS 3342	Advanced Clinical Microbiology II	2 QH
FMLS 3601	MLS Seminar: Clinical Chemistry, Hematology, Immunology, Management, Microbiology	4 QH
FINT 3201	Applications of Mass Spectrometry	2 QH

Selection of the remaining five quarter hours may be made from the above courses, as well as from the following and other appropriate courses in the Graduate School of Pharmacy and Allied Health Professions or in the rest of the University, with the approval of the director of the MS program in clinical chemistry.

Course No.	Course Name	Credit
CPHY 3401	Radiation Physics	2 QH
CPHY 3402	Radiobiology	2 QH
CCHM 3541	Inorganic Chemistry I	2 QH
CCHM 3542	Inorganic Chemistry II	2 QH
CCHM 3641	Coordination Chemistry	2 QH
CCHM 3561	Advanced Organic Chemistry I	2 QH
CCHM 3562	Advanced Organic Chemistry II	2 QH
CCHM 3563	Physical Organic Chemistry	2 QH
CCHM 3564	Spectrometric Identification of Compounds	2 QH
CCHM 3581	Thermodynamics I	2 QH
CCHM 3591	Atomic and Molecular Structure I	2 QH
CCHM 3594	Kinetics	2 QH
CBIO 1461	Serology-Immunology	3 QH
CBIO 3235	Genetics and Developmental Biology	2 QH
CBIO 3552	Comparative Physiology of Regulatory Mechanisms	2 QH
CBIO 3558	Vertebrate Endocrinology	3 QH
CBIO 3557	Procedures in Endocrinology	3 QH
CBIO 3560	Cell Biophysics and Biochemistry	5 QH
CBIO 3527	Virology	4 QH
CBIO 3569	Microbial Genetics	3 QH
CBIO 3627	Industrial Microbiology	3 QH
CBIO 3567	Microbial Biochemistry	4 QH
FRSC 3101	Nuclear Medicine I	2 QH
FRSC 3102	Nuclear Medicine II	2 QH
FRSC 3103	Nuclear Medicine III	2 QH
FRSC 3104	Nuclear Medicine IV	2 QH
FRSC 3601	Seminar and Research Report in Radiopharmaceutical Science	2 QH

Course No.	Course Name	Credit
FPMC 3141	Special Topics in Medicinal Chemistry	2 QH
FPMC 3161	Phytochemistry	2 QH
FPMC 3601	Medicinal Chemistry Seminar	2 QH
FTOX 3102	Concepts in Toxicology II	2 QH
FPCL 3111	Special Topics in Pharmacology	2 QH
FTOX 3121	Environmental Toxicology	2 QH
FPCL 3131	Receptor Pharmacology	2 QH
FMLS 3323	Hematology III—Coagulation	2 QH
FMLS 3343	Advanced Clinical Microbiology III	2 QH

PhD Program in Forensic Chemistry

This program is offered in conjunction with the College of Criminal Justice and Northeastern University's Barnett Institute of Chemical Analysis and Materials Science. This unique program is designed to provide the opportunity for preparation for research and leadership positions in forensic laboratories. The Chemistry Department is the registration department for two of the three specializations of this program, namely, forensic analytical chemistry and forensic materials science; a third specialization, forensic toxicology, is administered by the College of Pharmacy and Allied Health Professions, again in connection with the College of Criminal Justice. Admission is made through the registration department.

For students entering with a BS, completion of the MS course requirements in forensic chemistry (described below) with a 3.0 average is required to qualify for further PhD study. For students with MS degrees in forensic science or the natural sciences, individual programs are planned according to the student's background. The course of study includes comprehensive examinations, thesis research to be carried out at the Barnett Institute of Chemical Analysis and Materials Science, and an internship at a major forensic laboratory engaged in research. Application materials can be obtained by writing to:

Graduate Program in Forensic Chemistry
Barnett Institute of Chemical Analysis and Materials Science
Northeastern University
360 Huntington Avenue
Boston, Massachusetts 02115

Master of Science in Forensic Chemistry (Full-Time and Part-Time Program)

Admission

In addition to the admissions requirements listed on page 24, the applicant must have completed a baccalaureate degree in

the physical or life sciences. Undergraduate courses must include general chemistry, organic chemistry, analytical chemistry, physics, and calculus. An individual who has deficiencies in any of these areas may take the appropriate courses at Northeastern University (for undergraduate credit only) concurrently with those graduate courses that do not require the deficient prerequisites. Although they are not prerequisites for the program, courses in general biology, botany, microbiology, and computer science are desirable. Application materials can be obtained by writing to:

Graduate Program in Forensic Chemistry
College of Criminal Justice
144 Knowles-Volpe Hall
Northeastern University
360 Huntington Avenue
Boston, Massachusetts 02115

Program

The master of science in forensic chemistry is an interdisciplinary program involving cooperation among the College of Arts and Sciences, the College of Criminal Justice, and the Barnett Institute of Chemical Analysis and Materials Science. Forty-two quarter hours of academic graduate coursework is required, including a master's paper. In addition, a three-month internship consisting of full-time work in an approved, practicing forensic laboratory is required. The full-time program will thus generally encompass five quarters; this time may be reduced to four quarters if the student can demonstrate to the satisfaction of the program committee the prior completion of three months or more of equivalent forensic laboratory experience. The program is available on a full-time or part-time basis; courses are offered primarily during the evening hours. Graduate courses are scheduled in the fall, winter, and spring quarters. The following are core courses required in the program:

Course No.	Course Name	Credit
CCHM 3430	Modern Methods of Analysis	3 QH
FPCL 3101	Concepts of Pharmacology I	2 QH
CMTH 3221	Biostatistics	2 QH
HCJ 3203	Criminal Law	3 QH
HCJ 3503	Criminal Evidence	3 QH
HCJ 3201	The Criminal Justice Process	3 QH
HCJ 3414	Arson, Explosives and Gunshot Residue	3 QH
HCJ 3413	Crime Scene Investigation	3 QH
HCJ 3415	Forensic Materials	2 QH
HCJ 3416	Forensic Chemistry Techniques I	4 QH
HCJ 3417	Forensic Chemistry Techniques II	4 QH
HCJ 3418	Seminar	1 QH
HCJ 3810	Master of Science Paper	4 QH

Six additional quarter hours of credit must be taken from the following list of elective courses. Other graduate courses may serve as electives upon petition.

Course No.	Course Name	Credit
AME 3270	Materials Science and Engineering	2 QH
AME 3271	Materials Science and Engineering	2 QH
CCHM 3521	Analytical Separations	2 QH
CCHM 3523	Electroanalytical Chemistry	2 QH
CCHM 3525	Optical Methods of Analysis	2 QH
CCHM 3531	Special Topics of Analytical Chemistry I	2 QH
CCHM 3532	Special Topics of Analytical Chemistry II	2 QH
CCHM 3527	Special Topics of Analytical Chemistry III	2 QH
CCHM 3561	Advanced Organic Chemistry I	2 QH
CCHM 3562	Advanced Organic Chemistry II	2 QH
CCHM 3563	Physical Organic Chemistry	2 QH
CCHM 3564	Spectrometric Identification of Organic Compounds	2 QH
CCHM 3501	Polymer Chemistry I	2 QH
CCHM 3502	Polymer Chemistry II	2 QH
CCHM 3503	Polymer Chemistry III	2 QH
CBIO 1461	Serology and Immunology	3 QH
CBIO 1462	Serology and Immunology Lab	2 QH
FPMC 3301	Advanced Clinical Chemistry I	2 QH
FPMC 3302	Advanced Clinical Chemistry II	2 QH
FPMC 3101	Advanced Medicinal Chemistry I	2 QH
FPMC 3102	Advanced Medicinal Chemistry II	2 QH
FPCL 3102	Concepts in Pharmacology II	2 QH
FTOX 3101	Concepts in Toxicology I	2 QH
FTOX 3102	Concepts in Toxicology II	2 QH
FPCL 3161	Drug Metabolism	2 QH
FINT 3101	Biochemistry I	2 QH
CINT 3102	Biochemistry II	2 QH
FINT 3103	Biochemistry III	2 QH
HCJ 3251	Criminal Justice Planning and Development	3 QH
HCJ 3203	Criminal Law	3 QH
HCJ 3820	Directed Study in Forensic Chemistry	2 QH
HCJ 3821	Directed Study in Forensic Chemistry	3 QH

Course Listings

The following is a listing of all departmental course offerings. Please refer to the *1984–1985 Graduate Schools Course Descriptions* for course descriptions and relevant prerequisites.

Course No.	Course Name	Credit
CHM 3231	Remedial Analytical Chemistry	1 QH
CHM 3271	Remedial Organic Chemistry I	1 QH
CHM 3272	Remedial Organic Chemistry II	1 QH
CHM 3273	Remedial Organic Chemistry III	1 QH
CHM 3281	Remedial Physical Chemistry I	1 QH
CHM 3282	Remedial Physical Chemistry II	1 QH
CHM 3283	Remedial Physical Chemistry III	1 QH
CHM 3401	Special Topics in Chemistry: Chemistry and Society I	2 QH
CHM 3402	Special Topics in Chemistry: Chemistry and Society II	2 QH
CHM 3403	Special Topics in Chemistry: Chemistry and Society III	2 QH

Course No.	Course Name	Credit
CHM 3420	Modern Methods of Analysis	2 QH
CHM 3430	Modern Methods of Analysis/Laboratory	3 QH
CHM 3431	Remedial Instrumental Analysis	1 QH
CHM 3441	Remedial Inorganic Chemistry	1 QH
CHM 3461	Remedial Identification of Organic Compounds	1 QH
CHM 3501	Polymer Chemistry I	2 QH
CHM 3502	Polymer Chemistry II	2 QH
CHM 3503	Polymer Chemistry III	2 QH
CHM 3510	Special Projects in Chemistry	2 QH
CHM 3521	Analytical Separations	2 QH
CHM 3522	Advanced Analytical Separations	2 QH
CHM 3523	Electroanalytical Chemistry I	2 QH
CHM 3524	Electroanalytical Chemistry II	2 QH
CHM 3525	Optical Methods of Analysis I	2 QH
CHM 3526	Optical Methods of Analysis II	2 QH
CHM 3527	Analytical & Organic Mass Spectrometry	2 QH
CHM 3528	Computers in Chemistry	3 QH
CHM 3531	Special Topics in Analytical Chemistry I	2 QH
CHM 3532	Special Topics in Analytical Chemistry II	2 QH
CHM 3541	Advanced Inorganic Chemistry I	2 QH
CHM 3542	Advanced Inorganic Chemistry II	2 QH
CHM 3543	Advanced Inorganic Chemistry III	2 QH
CHM 3561	Advanced Organic Chemistry I	2 QH
CHM 3562	Advanced Organic Chemistry II	2 QH
CHM 3563	Physical Organic Chemistry	2 QH
CHM 3564	Spectrometric Identification of Organic Compounds	2 QH
CHM 3581	Chemical Thermodynamics I	2 QH
CHM 3582	Chemical Thermodynamics II	2 QH
CHM 3583	Chemical Thermodynamics III	2 QH
CHM 3591	Introductory Quantum Chemistry I	2 QH
CHM 3592	Introductory Quantum Chemistry II	2 QH
CHM 3593	Introductory Quantum Chemistry III	2 QH
CHM 3594	Chemical Kinetics	2 QH
CHM 3641	Coordination Chemistry	2 QH
CHM 3642	Special Topics in Inorganic Chemistry I	2 QH
CHM 3643	Special Topics in Inorganic Chemistry II	2 QH
CHM 3644	Special Topics in Inorganic Chemistry III	2 QH
CHM 3645	Special Topics in Inorganic Chemistry IV	2 QH
CHM 3661	Organic Stereochemistry and Reaction Mechanisms I	2 QH
CHM 3662	Organic Stereochemistry and Reaction Mechanisms II	2 QH
CHM 3663	Organic Reaction Mechanisms & Organic Synthesis I	2 QH
CHM 3664	Organic Reaction Mechanisms & Organic Synthesis II	2 QH
CHM 3671	Special Topics in Organic Chemistry I	2 QH
CHM 3672	Special Topics in Organic Chemistry II	2 QH
CHM 3673	Special Topics in Organic Chemistry III	2 QH
CHM 3681	Special Topics in Physical Chemistry I	2 QH
CHM 3682	Special Topics in Physical Chemistry II	2 QH
CHM 3683	Special Topics in Physical Chemistry III	2 QH
CHM 3800	Analytical Seminar	1 QH
CHM 3801	Inorganic Seminar	1 QH
CHM 3802	Organic Seminar	1 QH
CHM 3803	Physical Seminar	1 QH
CHM 3810	Research for MS	6 QH
CHM 3820	Research & Dissertation for PhD	0 QH
CHM 3798	Master's Thesis Continuation	0 QH
CHM 3799	Doctoral Dissertation Continuation	0 QH

Economics

Economics studies how societies produce and distribute goods and services and how income and wealth are distributed. Economists develop techniques that help identify and analyze society's problems and recommend alternative solutions, when needed. The relevance of economic skills is evidenced by the employment of economists in large numbers by government agencies and business firms, as well as by academic institutions.

Economics is both a theoretical and an applied social science. The Economics Department offers courses and programs that require students to apply economic theory to relevant social problems. Areas in which the department specializes include public policy and economic planning, labor economics and manpower planning, urban and regional economics, development economics, and monetary theory and finance.

The Economics Department offers four programs with different admissions requirements and program form and content, in an effort to serve students with varying backgrounds, interests, and goals. These programs include a nondegree certificate program, an MS degree program in economic policy and planning, an MA degree program with specialization in one of four available fields, and a doctoral degree program.

Professors

Morris A. Horowitz, PhD, *Harvard University, Chairperson*

Conrad P. Caligaris, PhD, *Brown University*

Harold M. Goldstein, PhD, *Clark University*

Daryl A. Hellman, PhD, *Rutgers University*

Irwin L. Herrnstadt, PhD, *Massachusetts Institute of Technology*

Sungwoo Kim, PhD, *University of California, Berkeley*

Gustav Schachter, PhD, *New York University*

Associate Professors

Neil Alper, PhD, *University of Pittsburgh*

Ernest M. DeCicco, PhD, *Boston University*

Pawan K. Sawhney, PhD, *Boston University*

Andrew Sum, MA, *Massachusetts Institute of Technology*

Gregory H. Wassall, PhD, *Rutgers University*

Assistant Professors

Bruce Bolnick, PhD, *Yale University*

Oscar Brookins, PhD, *State University of New York, Buffalo*

Kamran Dadkhah, PhD, *Indiana University*

Alan W. Dyer, PhD, *University of Maryland*

Barbara Fraumeni, PhD, *Boston College*

Jeanne K. Henn, PhD, *Harvard University*

Stephen A. Morrison, PhD, *University of California, Berkeley*

Research

The primary focus of research efforts by Economics Department members is on applying economic theory to contemporary problems. Recent research projects conducted by department members have included assistance in the development of small enterprises in Indonesia; development of a multi-regional input-output model of Italy; determination of factors affecting the choice of bus versus other intercity transportation media; evaluation of the effectiveness of federally funded employment and training programs; and estimation of factors that lead to financial success for artists.

Research in the department is facilitated by the department's own library, housing a collection of over 1,300 reference books and journals, and by the existence of several research centers within the department. Specifically, the Center for European Economic Studies, the Center for Labor Market Studies, the Center for Medical Manpower Studies, and the Center for Urban and Regional Economic Studies are all headquartered within the Economics Department. Also, computer hardware and software facilities are readily available, with six live terminals connected to the University computer for research use.

Economics faculty are active in disseminating the results of their research. Articles authored by economics faculty have appeared in virtually every major journal in the field.

Certificate Program

The Economics Department offers a nondegree program in the economics of manpower and development planning. Upon completion of the prescribed program, students will receive a certificate issued by the Graduate School of Arts and Sciences. The program is designed for students who are interested in a specialized program of courses in manpower and development planning but who do not wish to meet the requirements of a degree program.

Admission

Admission to the program will be considered for graduates of recognized universities or institutes of technology, although practical experience in manpower planning or development planning may be substituted for the admission requirements at the discretion of the faculty. All international students must submit a Test of English as a Foreign Language (TOEFL) test score or an equivalent certification of proficiency in English with the application and academic transcripts.

Program

This certificate program is designed to be completed in one year. Students admitted to the program may not transfer into the regular degree programs. Evidence of completion of a course and of the program will be attendance and performance of all required reading and all written work. Successful completion of a course will be noted by a pass designation.

Fall Quarter (All four courses required)

- ECN 3110 Introduction to Microeconomic Theory
- ECN 3120 Introduction to Macroeconomic Theory
- ECN 3350 Labor Economics
- ECN 3370 Economic Development

Winter Quarter (Select any two of three electives listed)

- ECN 3140 Introduction to Statistics (Required)
- ECN 3352 Economics of Manpower Planning I (Elective)
- ECN 3371 Regional Development (Elective)
- ECN 3372 Comparative Economic Development (Elective)

Spring Quarter (Select any three of four courses listed)

- ECN 3353 Economics of Manpower Planning II
- ECN 3359 Seminar in Human Resource Development
- ECN 3373 Development Finance and Trade
- ECN 3379 Development Planning Seminar

Variations in this basic program are possible only with prior approval of the departmental graduate director.

The Master of Science Degree in Economic Policy and Planning

Forty-one quarter hours of academic work is required. The program consists of twenty-three quarter hours of required courses and eighteen quarter hours of electives. With the approval of the student's adviser, a student may select a maximum of six quarter hours from graduate courses offered by other departments. This is a terminal degree program designed mainly for working economists, government agency officials, and middle-echelon employees in the private sector.

Admission Applicants must meet the general admissions regulations of the Graduate School of Arts and Sciences. Admission is only possible in the fall and winter quarters. Applications for admission to the fall quarter will be given consideration if received by July 31. Applications for admission to the winter quarter will be given consideration if received by October 31.

Applications for financial aid should be submitted no later than March 15. See page 16 for information on available financial aid.

Comprehensive Examination After completion of courses, a comprehensive examination is required of all students, to test their ability to apply concepts and tools in the broad field of economic policy and planning. The examination may be repeated only once.

Master’s Thesis A master’s thesis for a maximum of six quarter hours of credit is optional with the approval of the program adviser.

Course Requirements

<i>Required Core Courses</i>		
Course No.	Course Name	Credit
ECN 3110	Introduction to Microeconomic Theory	4 QH
ECN 3120	Introduction to Macroeconomic Theory	4 QH
ECN 3140	Introduction to Statistics	4 QH
ECN 3150	Microeconomic Policy and Planning Seminar	4 QH
ECN 3151	Macroeconomic Policy and Planning Seminar	4 QH
ECN 3152	Workshop in Economic Planning & Policy	3 QH

Students must receive a grade of B– or higher in all core courses. If a lower grade is received, a course meeting the core requirement must be taken or repeated (keeping in mind the Graduate School regulation that only six quarter hours or two courses, whichever is greater, may be repeated in order to satisfy requirements for the degree).

Elective Courses

A total of eighteen quarter hours of electives (twelve quarter hours of which must be economics courses) may be selected by the student in accordance with interests and needs. Electives may be concentrated in any of the available areas or may be distributed among fields to obtain a broader exposure. A maximum of six quarter hours of credit for courses taken at other institutions may be accepted if taken during the past seven years.

The Master of Arts Degree

Forty quarter hours of academic work is required. This program comprises sixteen quarter hours of required core coursework and twenty-four quarter hours of electives, of which a minimum of twelve quarter hours must be selected from one of the economic fields listed below. The required core courses must be completed as soon as possible. With the prior approval of the graduate director, a student may select a maximum of six quarter hours from graduate courses offered by other departments or two advanced undergraduate courses in economics carrying three quarter hours of graduate credit each.

Admission

In addition to the general admissions requirements of the Graduate School of Arts and Sciences, applicants should have had a minimum of twelve semester hours of economics (or the equivalent), of which three semester hours (or the equivalent) should be statistics. Students without previous economics training may be admitted to the program but will be required to make up deficiencies in economic theory and statistics (see under Required Courses). Admission is only possible in the fall and winter Quarters. Applications for admission to the fall quarter will be given consideration if received by July 31. Applications for admission to the winter quarter will be given consideration if received by October 31.

Applications for financial aid should be submitted no later than March 15. See page 16 for information on available financial aid.

Comprehensive Examination

A comprehensive examination, which will be held in accordance with the general Graduate School regulations, must be taken by all students during the quarter in which the student completes the forty quarter hours of academic work. The examination may be repeated only once.

Master's Thesis

A master's thesis for six quarter hours of credit is optional with the approval of the graduate adviser. Approval will be granted only in those instances in which a student's previous graduate work indicates capacity for independent study.

Required Core Courses*

The following are required core courses:

		Credit
ECN 3210	Microeconomic Theory I**	4 QH
ECN 3220	Macroeconomic Theory I**	4 QH
ECN 3240	Statistical Inference***	4 QH
ECN 3241	Econometrics I	4 QH

Students may not receive more than one C grade in the core courses. If more than one C is earned, those courses must be repeated and a grade of at least a B– must be obtained (keeping in mind the Graduate School regulation that only six quarter hours or two courses, whichever is greater, may be repeated in order to satisfy requirements for the degree).

Economic Fields

Available economic fields are listed below. Under each field are stated the required field courses and the elective field courses. Students must take at least twelve quarter hours in one field of concentration. In all fields, the first listed required course in the field ordinarily should be taken first by the student majoring in the field. For students not majoring in the field, courses in the field may be taken in any sequence.

Manpower Economics

Required field courses:

ECN 3350	Labor Economics
ECN 3352	Economics of Manpower Planning I
ECN 3359	Seminar in Human Resource Development

Elective field courses:

ECN 3351	Labor Economics II
ECN 3353	Economics of Manpower Planning II
ECN 3354	Economics of Medical Care & Health Manpower
ECN 3355	Economics of Education
ECN 3356	Local Labor Market Research Methods & Problems
ECN 3357	Human Resources Planning at State and Local Areas
ECN 3358	Economics of Education & Training Policy

Urban/Regional Economics

Required field courses:

ECN 3360	Regional Economics
ECN 3363	Urban Economic Systems
ECN 3364	Urban Economic Development

Elective field courses:

ECN 3365	Urban Transportation Economics
ECN 3371	Regional Development
ECN 3383	Intergovernment Finance

*Students must demonstrate competence in mathematics by taking a mathematics examination given by the department during registration week prior to the start of the fall or winter quarter. Students must pass this examination or satisfactorily complete ECN 3030, Introduction to Mathematics for Economists.

**Candidates deficient in intermediate theory may not be admitted into these core courses until they have completed ECN 3010, Introduction to Microeconomic Theory, and/or ECN 3020, Introduction to Macroeconomic Theory.

***Students may meet the prerequisite of this course by passing a statistics examination given by the department during registration week prior to the start of the fall or winter term or by satisfactory completion of ECN 3040, Introduction to Statistics.

Development Economics

Required field courses:

- ECN 3370 Economic Development
- ECN 3371 Regional Development
- ECN 3379 Developmental Planning Seminar

Elective field courses:

- ECN 3352 Economics of Manpower Planning I
- ECN 3360 Regional Economics
- ECN 3372 Comparative Economic Development
- ECN 3373 Developmental Finance and Trade

Economics of Money and Finance

Required field courses:

- ECN 3380 Monetary Theory
- ECN 3381 Monetary Policy
- ECN 3389 Money Credit Banking Seminar

Elective field courses:

- ECN 3373 Development Finance and Trade
- ECN 3382 Public Policy & Finance
- ECN 3383 Intergovernment Finance
- ECN 3384 Capital Markets

The Doctor of Philosophy Degree

The doctoral degree program in economics is offered in the fields of manpower, urban/regional, development, and monetary economics.

Admission

Applicants who will have a master's degree in economics or its equivalent at entry may be considered for direct admission to the doctoral program. Applicants who will not have a master's degree in economics or its equivalent at entry may apply for admission to the doctoral program but must satisfactorily complete an additional forty quarter hours of graduate work equivalent to a master's degree. Such students should submit the Graduate Record Examination (GRE) scores if available.

Admission to the doctoral program is possible only in the fall quarter. Applications for the doctoral program must be submitted no later than July 31. Applications for financial aid should be submitted no later than March 15. See page 16 for information on available financial aid.

Residence Requirement

After acceptance to the doctoral program, the student may satisfy the residence requirement by one year of full-time graduate coursework. Teaching assistants may satisfy the residence requirement by two consecutive years of half-time graduate coursework. A student should expect to spend at least two academic years in full-time study (or its equivalent) in completing the requirements for the doctoral degree.

Degree Candidacy	Degree candidacy is established in accordance with the general Graduate School regulations.
Course Requirements	<p>At least thirty-two quarter hours of graduate work beyond the master's degree is required. The required core courses are:</p> <p>ECN 3510 Microeconomic Theory II ECN 3520 Macroeconomic Theory II ECN 3530 Mathematics for Economists ECN 3540 Econometrics II</p> <p>Concentration is required in one academic field. Coursework in the field must include the doctoral seminar sequence ECN 3601 and ECN 3602. This seminar has a prerequisite of twelve quarter hours of graduate coursework in the field.</p>
Qualifying Examinations	<p>Each student must pass comprehensive qualifying examinations after the completion of the required core and field courses. These examinations include: (1) a two-hour written examination in macroeconomic theory; (2) a two-hour written examination in microeconomic theory; (3) a two-hour written examination in quantitative methodology; (4) a three-hour written examination in one doctoral field; and (5) a two-hour general oral examination. No qualifying examination may be taken until all required coursework in the field tested by the examination has been completed. An examination may be repeated only once.</p>
Doctoral Dissertation	<p>An original doctoral dissertation is required of all students in accordance with the general Graduate School regulations and the regulations established by the department. After the successful completion of the qualifying examinations, students are expected to work with dissertation advisers, under whose guidance they write the doctoral dissertation. Once a dissertation topic and committee have been chosen, the doctoral candidate must present the topic to a seminar of graduate faculty. The dissertation adviser serves as chairperson of the dissertation committee, which must approve the dissertation before the degree may be conferred.</p>
Final Oral Examination	<p>The final oral examination is established in accordance with the general Graduate School regulations.</p>

Course Listings

The following is a listing of all departmental course offerings. Please refer to the 1984–1985 *Graduate Schools Course Descriptions* for course descriptions and relevant prerequisites.

Course No.	Course Name	Credit
ECN 3010	Introduction to Intermediate Microeconomic Theory	3 QH
ECN 3020	Introduction to Intermediate Macroeconomic Theory	3 QH
ECN 3030	Introduction to Mathematics for Economists	4 QH
ECN 3040	Introduction to Statistics	0 QH
ECN 3110	Introduction to Intermediate Microeconomic Theory	4 QH
ECN 3120	Introduction to Intermediate Macroeconomic Theory	4 QH
ECN 3130	Introduction to Mathematics for Economists	3 QH
ECN 3140	Introduction to Statistics	4 QH
ECN 3150	Microeconomic Policy Planning Seminar	4 QH
ECN 3151	Macroeconomic Policy Planning Seminar	4 QH
ECN 3152	Workshop in Economic Planning & Policy	3 QH
ECN 3210	Microeconomic Theory I	4 QH
ECN 3220	Macroeconomic Theory I	4 QH
ECN 3240	Statistical Inference	4 QH
ECN 3241	Econometrics I	4 QH
ECN 3310	Case Studies in Applied Microeconomics	3 QH
ECN 3330	Economic Programming	3 QH
ECN 3331	Accounting for Economists	3 QH
ECN 3350	Economics of the Labor Market and Labor Force I	3 QH
ECN 3351	Economics of the Labor Market and Labor Force II	3 QH
ECN 3352	Economics of Manpower Planning I	3 QH
ECN 3353	Economics of Manpower Planning II	3 QH
ECN 3354	Economics of Medical Care & Health Manpower	3 QH
ECN 3355	Economics of Education	3 QH
ECN 3356	Local Labor Market Research Methods & Problems	3 QH
ECN 3357	Human Resources Planning at State and Local Areas	3 QH
ECN 3358	Economics of Education & Training Programs	3 QH
ECN 3359	Seminar in Human Resource Development	3 QH
ECN 3360	Regional Economics	3 QH
ECN 3361	Externalities	3 QH
ECN 3362	Economics of Crime	3 QH
ECN 3363	Urban Economic Systems	3 QH
ECN 3364	Urban Economic Development	3 QH
ECN 3365	Economics of Urban Transportation	3 QH
ECN 3366	Economics of Intercity Transportation	3 QH
ECN 3369	Urban Regional Economics Seminar	3 QH
ECN 3370	Economic Development	3 QH
ECN 3371	Regional Development	3 QH
ECN 3372	Comparative Economic Development	3 QH
ECN 3373	Development Finance and Trade	3 QH
ECN 3379	Development Planning Seminar	3 QH
ECN 3380	Monetary Theory	3 QH
ECN 3381	Monetary Policy	3 QH
ECN 3382	Public Policy & Finance	3 QH
ECN 3383	Intergovernment Fiscal Relations	3 QH
ECN 3384	Capital Markets	3 QH
ECN 3389	Money Credit Banking Seminar	3 QH
ECN 3510	Microeconomic Theory II	4 QH
ECN 3511	Economics and the Law	1 QH
ECN 3520	Macroeconomic Theory II	4 QH

Course No.	Course Name	Credit
ECN 3530	Mathematics for Economics	4 QH
ECN 3540	Econometrics II	3 QH
ECN 3601	Doctoral Research Seminar I	4 QH
ECN 3602	Doctoral Research Seminar II	4 QH
ECN 3890	Master's Thesis Seminar	(Maximum 6 QH)
ECN 3895	Readings in Economics	(Up to 3 QH)
ECN 3899	Doctoral Dissertation Seminar	0 QH
ECN 3798	Master's Thesis Continuation	0 QH
ECN 3799	Doctoral Dissertation Continuation	0 QH

English

The graduate program in English engages many of the theoretical and applied issues generated by the study of literature and language—literary history and theory, linguistics, with particular application to stylistics and the teaching of writing, and creative and technical writing. Graduate study takes full advantage of the rich opportunities offered by Boston's museums and libraries.

The Department of English offers a range of programs. The Program in Literature, with the option of a Concentration in British Literature or a Concentration in American Literature, provides the opportunity for training in research and in theory as preparation for a career as a scholar and teacher of literature. The Program in Writing offers either a Concentration in Linguistics and Writing, which provides theoretical and practical preparation in the teaching of writing, or a Concentration in Technical and Professional Writing, which allows the student to prepare for a career as a professional writer.

Professor Emeritus

Samuel F. Morse, PhD, *Boston University*

Professors

Kinley E. Roby, PhD, *Pennsylvania State University*, *Chairperson*

Samuel J. Bernstein, PhD, *Brandeis University*

Robert J. Blanch, PhD, *State University of New York, Buffalo*

Earl N. Harbert, PhD, *University of Wisconsin*

Victor E. Howes, PhD, *Yale University*

M. X. Lesser, PhD, *Columbia University*

James Nagel, PhD, *Pennsylvania State University*

Jane A. Nelson, PhD, *University of Michigan*

Herbert L. Sussman, PhD, *Harvard University*

Arthur J. Weitzman, PhD, *New York University*

Paul C. Wermuth, PhD, *Pennsylvania State University*

Associate Professors

Francis C. Blessington, PhD, *Brown University*
Timothy R. Donovan, PhD, *University of Wisconsin*
Irene R. Fairley, PhD, *Harvard University*
Gary Goshgarian, PhD, *University of Wisconsin*
Gerald R. Griffin PhD, *University of Massachusetts*
Ruth MacDonald, PhD, *Rutgers University*
Stuart S. Peterfreund, PhD, *University of Washington*
Guy Rotella, PhD, *Boston College*
Joseph E. Westlund, PhD, *University of California, Berkeley*

Assistant Professors

Richard Bullock, PhD, *University of Virginia*
Michael B. Goodman, PhD, *State University of New York, Stony Brook*
Helen Loeb, PhD, *University of Wisconsin*
Janet Randall, PhD, *University of Massachusetts*
Michael Ryan, PhD, *University of Iowa*
Kristin Woolever, PhD, *University of Pittsburgh*

Research

The faculty carries on an active program of research and writing reflecting the varied interests of the department—in literary studies and critical theory, in the writing of both poetry and fiction, and in the theory and practice of composition and of technical and professional writing. Graduate students work as editorial assistants for the journals published by the department: *The Scriblerian*, *Romanticism Past and Present*, and *Studies in American Fiction*. The Northeastern University Center for Literary Studies, sponsored by the department, each year invites distinguished critics to discuss with students and faculty a single issue in literary theory; these debates are published as the annual *Proceedings of the Center for Literary Studies*.

Admission

For application procedures and requirements, please consult page 24. Applicants are judged favorably if they do superior work in their undergraduate preparation. Two recommendations should be submitted by professors familiar with the student's work in literature and writing. The Test of English as a Foreign Language (TOEFL) examination must be taken by international students.

The category of special student is provided for those non-degree students who wish to take an individual course or those already enrolled in a graduate program in another institution who wish to transfer credit. An applicant already holding a graduate degree may also enroll as a special student.

The Master of Arts Degree in English

The Program in Literature requires that a student take courses in prescribed historical areas. The Program in Writing is organized differently, as set forth below. Both programs leading to the MA in English require that the student fulfill the core curriculum.

The Core Curriculum All students earning the MA in English must take at least one course from each of the following categories:

An Introduction to Literary Study (ENG 3300)

Theories of criticism or linguistics

British literature

American literature

All students earning the MA must take the MA comprehensive examination.

Program in Literature All students in this program must take a total of fourteen courses (forty-two quarter hours of credit). In addition to satisfying the requirements of the core curriculum, students in the Program in Literature must satisfy the following historical and national distribution requirements by taking at least one course in each of the following areas:

Medieval and early Renaissance literature (to 1660)

Restoration and eighteenth-century literature

Nineteenth-century literature

Twentieth-century literature

Each student must also satisfy distribution requirements by taking at least two of these fourteen courses in British literature and at least two of these fourteen courses in American literature. These distribution requirements represent the need to take one course in British literature and one course in American literature beyond those requirements mandated in the core curriculum. Courses in the core curriculum may be used to satisfy basic Program in Literature requirements.

The above are the minimum distribution requirements for the Program in Literature. In addition, all students sitting for the MA comprehensive examination must elect area I (Individual Work, to vary by year) and three other areas. At least one of the four areas chosen must be in British literature, and at least one of the areas chosen must be in American literature. Area I may be used to satisfy this examination breadth requirement.

Students have the option of exceeding the distribution requirements for the Program in Literature by electing to concentrate in either British or American literature.

Concentration in British Literature

A student pursuing a concentration in British literature must satisfy the requirements for the core curriculum and the Program in Literature, in addition to those for the concentration in British literature. No course may be used to satisfy a requirement in both lists.

The concentration in British literature requires a minimum of five graduate courses, exclusive of those taken to fulfill the core curriculum and basic program requirements, selected so as to cover the following areas:

Medieval and early Renaissance literature (to 1660)—one course
Restoration and eighteenth-century British literature—one course

Nineteenth-century British literature—one course

Twentieth-century British literature—one course

British literature elective—one course

The student must elect three areas in British literature on the MA comprehensive examination. One of these areas must be the individual work.

Concentration in American Literature

A student pursuing a concentration in American literature must satisfy the requirements for the core curriculum and the Program in Literature, in addition to those for the concentration in American literature. No course may be used to satisfy a requirement in both lists.

The concentration in American literature requires a minimum of six graduate courses, exclusive of those taken to fulfill the core curriculum and basic program requirements, selected so as to cover the following areas:

Early American literature—one course

Nineteenth-century American literature—one course

Twentieth-century American literature—one course

American literature elective—three courses

The student must elect three areas in American literature on the MA comprehensive examination. One of these areas must be the individual work.

Program in Writing

Concentration in Linguistics and Writing

A student in the linguistics and writing concentration must satisfy the core curriculum requirements. All students in this concentration must take a total of fourteen courses (forty-two quarter hours of credit), of which seven courses (twenty-one

quarter hours of credit) must be in linguistics and writing. At least one course must be taken in each of the following groups:

Group 1

- ENG 3400 English Grammar
- ENG 3404 Language & Its Structure

Group 2

- ENG 3321 Linguistics and Literary Study
- ENG 3401 Semantics
- ENG 3402 History of the English Language

Group 3

- ENG 3311 English Prose Style
- ENG 3322 Linguistics and the Art of Writing
- ENG 3353 Problems in Writing
- ENG 3403 Topics in Linguistics

Other courses in linguistics and writing listed in the catalog include the following:

- ENG 3312 Theories of Teaching of Writing
- ENG 3350 Creative Writing I (Prose)
- ENG 3351 Creative Writing II (Poetry)
- ENG 3354 Technical Writing
- ENG 3405 Descriptive Linguistics
- ENG 3406 Introduction to Syntax

The student must elect the areas of Linguistics, Writing and Applied Linguistics, and Individual Work (area I) on the MA comprehensive examination.

Concentration in Technical and Professional Writing

A student in the Technical and Professional Writing Concentration must satisfy the core curriculum requirements. All students in this concentration must take a total of fourteen courses (forty-two quarter hours of credit), of which six courses (eighteen quarter hours of credit) must be in the following areas. At least one course must be taken in each of the following groups:

Group 1

- ENG 3352 Writing for the Professions
- ENG 3354 Technical Writing

Group 2

- ENG 3349 Workshop in Writing for Publication
- ENG 3355 Topics in Technical Writing

Group 3

- ENG 3322 Linguistics and the Art of Writing
(or equivalent linguistics course)
- ENG 3348 Research Materials and Methods for Technical Writing

Group 4

- ENG 3358 Topics in Non-Fiction Prose
(or equivalent course in nonfiction prose)

Group 5

ENG 3353 Problems in Writing

ENG 3602 Independent Study (in writing)

Any writing course in groups 1 and 2 not taken for distribution in that area.

Group 6

Elective in science, technology, or the professions. One computer science course is recommended.

If the student's schedule allows, a course in graphic arts (including design, layout, and production) or in speech communications is recommended. Such coursework would need to be approved by the Graduate Director and the Director of the Graduate School in order to be accepted for graduate credit. The student must elect the areas of Writing and Applied Linguistics, Technical and Professional Writing, and Individual Work (area I) on the M.A. comprehensive examination.

Transfer Credit

A student may transfer from another institution no more than twelve quarter hours (nine semester hours) of graduate credit in English. Within this limit, graduate courses in other fields may also be transferred if their relevance to the student's program can be demonstrated. Please refer to the section on transfer credit on page 31 for full details.

Thesis

A thesis is optional. A student wishing to write a master's thesis must secure the approval of the chairperson of the graduate committee and must write the thesis under the supervision of a faculty adviser. Six quarter hours of credit in lieu of coursework is allowed. The student must enroll in ENG 3601, Thesis, to obtain credit.

Directed Study

A student may apply for a maximum of six quarter hours of directed study, not including a thesis.

Students must obtain the consent of their academic adviser and then that of the instructor who will direct the study. A course proposal should be developed, outlining the works to be covered, the general requirements to be met, and the quarter hours of credit for which the study is offered. Such a proposal must be submitted for approval to the chairperson of the graduate committee.

Directed study is not advised when a course in the same subject is offered during the academic year. Directed study should not substitute for regular course offerings.

Comprehensive Examination

A four-hour comprehensive examination, given during the spring quarter, is required. Copies of previous examinations are available in the departmental office. A student must accrue



thirty quarter hours of credit with an average of 3.000 or higher before being eligible to take the examination. The examination may be taken only twice. Students may choose an oral examination in lieu of the written comprehensive. Students who wish to pursue this option must arrange to do so through the graduate committee chairperson.

**Language
Requirement**

A degree candidate must pass a reading examination in French, German, or Latin, to be offered during the fall and spring quarters. Students may petition for exemption.

Grades

To qualify for the comprehensive examination and for the degree, a student must achieve a minimum cumulative average of 3.000. Students who receive more than two C's in their first two quarters of residence may be dropped from the program. An incomplete grade is granted only in extraordinary circumstances and is not given automatically. Please refer to the section on grades on page 29.

**Residence and Time
Limitation**

A student who does not register for a course in a calendar year must reapply for admittance to the program. Course credits are valid for a maximum of seven years, unless an extension is allowed by the dean of the Graduate School of Arts and Sciences.

Awards

Teaching assistantships are awarded on a competitive basis to a limited number of entering and continuing students. These assistantships provide both a waiver of tuition and a stipend. Normally, a teaching assistant takes two courses each quarter, but he/she may take more with permission. Teaching assistants are expected to make satisfactory progress toward the degree.

Northeastern University Tuition Assistantships, which provide a waiver of tuition to students who assist faculty in research for ten hours a week, are also available to a limited number of entering and continuing students. For further details regarding assistantships, see page 20.

Master of Technical and Professional Writing

The Master of Technical and Professional Writing provides graduate training for those who wish to become professional writers in industry, science, business, government, and related fields. Courses have been selected to give students the opportunity to acquire the following: first, the writing, research, and editing skills they will need; second, background in an appro-

priate area of science, technology, or business; and third, other communication skills in graphic arts and speech communication.

Students must take a total of fourteen courses (forty-two quarter hours).

In place of the M.A. Comprehensive Examination, students will be required to complete a portfolio of technical or professional documentation and defend it before a committee of graduate faculty from the English Department and faculty from the student's scientific, technical, or professional area of study. If the student's documentation was prepared as part of an internship or similar position, the student's supervisor must verify that the documentation meets all technical and other requirements.

Students in the program will be eligible for teaching assistantships, awarded on a competitive basis. These provide a waiver of tuition. A stipend is also given with the award in return for academic assistance in the department in areas directly related to the teaching function.

Course Requirements

The following fourteen required courses and electives comprise the Master of Technical and Professional Writing.

Courses in the English Department

Writing Courses

Three of the following:

- ENG 3354 Technical Writing
- ENG 3355 Topics in Technical Writing
- ENG 3352 Writing for the Professions (Business Administration)
- ENG 3349 Workshop in Writing for Publication in Technical, Scientific, and Professional Journals

Required Courses

- ENG 3322 Linguistics and the Art of Writing
- ENG 3348 Research Materials and Methods of Technical, Scientific, and Professional Writing
- ENG 3602 Independent Study (must be in Technical or Professional Writing)

Electives

One of the following, or equivalent, by consent of adviser, or a course not taken in the Writing Courses section, above.

- ENG 3358 Topics in Non-Fiction Prose
- ENG 3353 Problems in Writing
- ENG 3602 Independent Study

Courses in Computer Science

- CMTH 1172 PASCAL
- or
- BCOM 1100 PASCAL I

One of these courses or, by consent of an adviser, an equivalent programming language. Courses in BASIC or Introduction to Data Processing will not count as credits toward the degree.

Communications Courses

These are undergraduate courses that must be approved by an adviser and by the Director of the Graduate School as equivalent to graduate-level coursework.

- Graphic Arts (emphasis on graphic design, layout, and production) or equivalent graphics course.
- Business and Professional Communication, or equivalent Speech Communications course.

Professional Sequence

Three graduate-level courses in *one* technical, scientific, professional, or literary area, for example, computer science, natural sciences (biology, chemistry, mathematics, physics), pharmacy or health sciences, engineering, and business administration. Other areas may be substituted by consent of an adviser from the graduate faculty.

Elective

One elective from one of the groups listed in Professional Sequence section, above.

Technical Writing Training Program

The Department of English, in cooperation with the Graduate School of Arts and Sciences, offers a training program in computer science and technical writing for the computer industry, open to those holding at least a bachelor's degree in any discipline.

This full-time program leads to a certificate of completion. Although no degree is awarded, the English courses carry full graduate credit. Emphasis is placed on professional placement.

Admission

Candidates must submit undergraduate and graduate transcripts, three letters of recommendation from professors or supervisors familiar with their work, and professional or academic writing samples. Candidates are also required to score above average on the SRA Computer Programmer Aptitude Battery, and to have taken at least one programming course.

Program This certificate program is designed to be completed in one academic year. Three intensive courses in computer science and three intensive courses in technical writing are required; they will be determined in advance by the program directors.

Certificate of Advanced Graduate Study

The Department of English offers a program of advanced work in literary study leading to a certificate of advanced graduate study. It is designed for those people who already hold the master's degree. Neither an intermediate step toward a research-oriented PhD nor instruction in pedagogy, the program is designed as state-of-the-art training in literary studies. The program is directed toward practitioners in the field, as well as toward those for whom continuing literary study is an end in itself. The program is designed for both full-time and part-time study. Teaching assistantships and Northeastern University Tuition Assistantships are available to a limited number of entering and continuing students in the program.

Admission Applicants must have a master's degree and are expected to submit transcripts of undergraduate and graduate work.

Program Each student will follow an individualized, coherent course of study built around his/her own needs and designed in close association with a faculty adviser. The student will develop the outline of this program by the end of the first quarter of work at Northeastern and will follow the program, under the supervision of the adviser, throughout his/her work at Northeastern. Forty-two quarter hours of work are needed to complete the program. With permission of the adviser, the student may take up to three graduate courses in other departments.

Examination The student must pass an oral comprehensive examination based on the individual program of study. The examination includes the evaluation of a lecture/classroom presentation.

Course Listings

The following is a listing of all departmental course offerings. Please refer to the 1984–1985 *Graduate Schools Course Descriptions* for course descriptions and relevant prerequisites.

All courses carry three quarter hours of credit unless otherwise specified.

Course No.	Course Name
ENG 3300	An Introduction to Literary Study
ENG 3311	English Prose Style
ENG 3312	Theories of Teaching Writing
ENG 3315	Theories of Criticism
ENG 3316	Critical Schools
ENG 3321	Linguistics and Literary Study
ENG 3322	Linguistics and the Art of Writing
ENG 3323	Theatrical Styles
ENG 3324	Perspectives on American Literature
ENG 3348	Research Materials and Methods for Technical Writing
ENG 3349	Workshop in Writing for Publication
ENG 3350	Creative Writing I (Prose)
ENG 3351	Creative Writing II (Poetry)
ENG 3352	Writing for the Professions
ENG 3353	Problems in Writing
ENG 3354	Technical Writing
ENG 3355	Topics in Technical Writing
ENG 3356	Topics in Writing
ENG 3357	Topics in Writing
ENG 3358	Topics in Non-Fiction Prose
ENG 3400	English Grammar
ENG 3401	Semantics
ENG 3402	History of the English Language
ENG 3403	Topics in Linguistics
ENG 3404	Language & Its Structure
ENG 3405	Descriptive Linguistics
ENG 3406	Introduction to Syntax
ENG 3407	Children's Literature
ENG 3408	Literature and the Visual Arts
ENG 3409	Literature and Psychology
ENG 3410	Short Story
ENG 3411	Comic Drama
ENG 3412	Tragic Drama
ENG 3413	Humor in American Literature
ENG 3414	Satire
ENG 3415	Literary Impressionism
ENG 3550	Classical Backgrounds
ENG 3551	Chaucer's <i>Troilus and Criseyde</i>
ENG 3552	Chaucer's <i>Canterbury Tales</i>
ENG 3553	Middle English Lyrics and Drama
ENG 3554	Studies in 14th-Century Literature
ENG 3555	Tudor Poetry
ENG 3556	Renaissance Drama
ENG 3558	Shakespeare's Tragedies
ENG 3559	Shakespeare's Comedies
ENG 3560	Problems in Shakespearean Interpretation
ENG 3561	17th-Century Literature
ENG 3562	Milton's Major Poetry
ENG 3563	Restoration and Early 18th-Century Literature
ENG 3564	Age of Johnson
ENG 3565	Topics in Augustan Literature
ENG 3566	18th-Century Fiction
ENG 3567	Individual 18th-Century Novelist
ENG 3568	Romantic Poetry I
ENG 3569	Romantic Poetry II
ENG 3570	Topics in Romanticism

Course No.	Course Name
ENG 3571	Victorian Literature
ENG 3572	Victorian Poetry
ENG 3573	Victorian Novel
ENG 3574	Individual Victorian Novelist
ENG 3575	Topics in Victorian Literature
ENG 3576	20th-Century British Literature
ENG 3577	Early 20th-Century British Poetry
ENG 3578	Contemporary British Poetry
ENG 3579	Individual Modern British Poet
ENG 3580	20th-Century British Fiction
ENG 3581	Individual Modern British Novelist
ENG 3582	20th-Century Irish Renaissance
ENG 3583	Early American Literature
ENG 3584	Literature of the Early Republic
ENG 3585	19th-Century American Literature
ENG 3586	American Literature 1830–1865
ENG 3587	19th-Century American Poetry
ENG 3588	The Romance in America
ENG 3589	The Rise of Realism
ENG 3590	Literature of the American South
ENG 3591	Modern American Poetry
ENG 3592	Modern American Drama
ENG 3593	Individual Modern American Poet
ENG 3594	Contemporary American Novel
ENG 3595	Individual Modern American Novelist
ENG 3596	Individual American Writer
ENG 3597	Contemporary American Poetry
ENG 3598	20th-Century American Fiction
ENG 3599	Humor in American Literature
ENG 3600	19th-Century European Novel
ENG 3601	Thesis
ENG 3602	Independent Study
ENG 3798	Master's Thesis Continuation

History

The study of history encompasses the entire range of human experience at all times and in all places. At the graduate level at Northeastern University, students in history study methodology and historiography, pursue original research and writing in seminars, and specialize in periods, areas, or fields of particular interest to them.

Professors

Raymond H. Robinson, PhD, *Harvard University, Chairperson*
Philip N. Backstrom, Jr., PhD, *Boston University*
William M. Fowler, PhD, *University of Notre Dame*
Donald M. Jacobs, PhD, *Boston University*
John D. Post, PhD, *Boston University*

Associate Professors

Charmarie J. Blaisdell, PhD, *Tufts University*
Ballard C. Campbell, PhD, *University of Wisconsin*
Norbert L. Fullington, PhD, *Harvard University*
LaVerne J. Kuhnke, PhD, *University of Chicago*
Clay McShane, PhD, *University of Wisconsin*
Stanley R. Stembridge, PhD, *Harvard University*

Assistant Professors

Laura L. Frader, PhD, *University of Rochester*
Ruth-Ann M. Harris, PhD, *Tufts University*
Gerald H. Herman, MA, *Northeastern University*
Martin R. Ring, PhD, *Tulane University*

Research

Faculty research interests cover a wide spectrum. Recently published books include *Parliament, the Press, and the Colonies; Representative Democracy: Public Policy and Midwestern Legislatures in the Late Nineteenth Century; Index to the American Slave; and Jack Tars and Commodores: A History of the American Navy, 1783–1815*. Awaiting publication is a book on food shortage, climatic variability, and epidemic disease in early Europe. Research projects under way include studies of women in the Reformation, agricultural labor and collective action in southern France, and

the legacy of Islamic medicine. A computer-aided analysis of "Missing Friends" advertisements in the *Boston Pilot* as genealogical source and social history data of county origins of Irish immigrants and a project for public radio on the culture of the late nineteenth century are also in progress.

The Master's Degree

Admission

Procedures and requirements are discussed on page 24. Applicants for the fall quarter who submit their application and all supporting documents by March 15 will be notified on or about April 1. Students who are interested in financial assistance must file all material by March 15.

Programs

Two programs are available for candidates for the Master of Arts degree.

Option I

This program is designed for those who are interested in pursuing careers in research, writing, and teaching and requires forty-one quarter hours of academic work.

Students must take the following courses:

HST 3241 Methodology

HST 3242 European Historiography
 or

HST 3243 American Historians

Two courses specifically labeled "seminar," except for students writing theses, who need take only one seminar.

Students must complete HST 3241 prior to enrolling in seminars, and grades of at least B must be obtained in the seminars.

In addition, students must complete at least one course in each of three areas: group 1, Europe; group 2, United States; and group 3, other areas. Group requirements are not satisfied by the historiography courses, HST 3242 and HST 3243.

With the prior approval of the faculty adviser, a maximum of three courses may be elected from either graduate courses in other departments or advanced undergraduate courses in history or related subjects. The undergraduate courses also require the approval of the Director of the Graduate School of Arts and Sciences.

A thesis is optional with the approval of the graduate committee. If approved, a thesis carries nine quarter hours of credit.

Option II

The second option, focusing on historical agencies and administration, is designed for those interested in careers outside the classroom. The subject matter of this option comprises the new and developing area of public, or applied, history. Many of the courses are taught by professionals in the Boston area.

The program requires forty-two quarter hours of academic work. The following courses are required:

- | | |
|----------|--|
| HST 3241 | Methodology |
| HST 3242 | European Historiography |
| | or |
| HST 3243 | American Historians |
| HST 0000 | Computer Applications for Non-Profit Organizations |
| HST 3821 | Fieldwork in History I |
| HST 3822 | Fieldwork in History II |
- One course specifically labeled "seminar."

In addition, students must select four of the following:

- | | |
|----------|---------------------------------------|
| HST 3601 | Historical Administration |
| HST 3602 | Historical Societies & Archives |
| HST 3603 | Historical Exhibits & Museums |
| HST 3605 | Historical Editing |
| HST 3610 | Industrial Archeology |
| HST 3611 | Historic Preservation |
| HST 3620 | Oral History |
| HST 3621 | Genealogical Research: Methods & Uses |
| HST 3622 | Local History Methodology |
| HST 3625 | Media and History |

The remaining three courses are taken from the list of graduate courses in history.

With the prior approval of the faculty adviser, a maximum of three courses may be elected from either graduate courses in other departments or advanced undergraduate courses in history or related subjects. The undergraduate courses also require the approval of the Director of the Graduate School of Arts and Sciences.

A brochure describing this second option in further detail is available by request from the Department of History.

Comprehensive Examination

All degree candidates must pass a written comprehensive examination or satisfy an optional requirement specified by the department.

Language Requirement

Degree candidates must demonstrate proficiency in a foreign language approved by the department or, as an alternative option, proficiency in either computer programming or advanced statistics.

Financial Aid

In addition to teaching and tuition assistantships, the department awards a scholarship in memory of Professor Robert A. Feer, a member of the Department of History from 1963 to 1970.

Course Listings

The following is a listing of all departmental course offerings. Please refer to the *1984–1985 Graduate Schools Course Descriptions* for course descriptions and relevant prerequisites.

Course No.	Course Name	Credit
HST 3241	Methodology	3 QH
HST 3242	European Historiography	3 QH
HST 3243	American Historians	3 QH
HST 3301	Ancient Greece	3 QH
HST 3302	Ancient Rome	3 QH
HST 3306	The Renaissance	3 QH
HST 3307	The Reformation	3 QH
HST 3310	Intellectual History of Europe 1688–1789	3 QH
HST 3311	Intellectual History of Europe 1789–1870	3 QH
HST 3312	Intellectual History of Europe 1870–1950	3 QH
HST 3315	Diplomatic History of Europe 1815–1914	3 QH
HST 3318	Imperialism	3 QH
HST 3320	20th Century Europe	3 QH
HST 3322	Socialism and Revolution	3 QH
HST 3330	Britain 1688–1815	3 QH
HST 3331	Britain 1815–1914	3 QH
HST 3332	Britain Since 1914	3 QH
HST 3339	Modernization of Ireland	3 QH
HST 3345	Hitler's Germany	3 QH
HST 3370	Family History	3 QH
HST 3380	Seminar in the Renaissance	4 QH
HST 3381	Seminar in the Reformation	4 QH
HST 3382	Seminar in European Intellectual History	4 QH
HST 3383	Seminar in 19th Century Europe	4 QH
HST 3384	Seminar in 20th Century Europe	4 QH
HST 3385	Seminar in European Social History	4 QH
HST 3386	Seminar in Imperialism	4 QH
HST 3387	Seminar in 19th Century Britain	4 QH
HST 3388	Seminar in 20th Century Britain	4 QH
HST 3389	Seminar in Modern France	4 QH
HST 3390	Seminar in Russian History	4 QH
HST 3397	Seminar in Comparative Labor History	4 QH
HST 3399	Seminar in Approaches to Women's History	4 QH
HST 3404	Colonial America: The 17th Century	3 QH
HST 3405	Colonial America: The 18th Century	3 QH
HST 3407	The American Revolution	3 QH
HST 3410	Topics in American Reform	3 QH

Course No.	Course Name	Credit
HST 3413	Topics in the Civil War and Reconstruction	3 QH
HST 3420	Public Life in 19th Century America	3 QH
HST 3421	Political Change in 20th Century America	3 QH
HST 3423	The Age of Roosevelt	3 QH
HST 3434	American Social History 1900–1950	3 QH
HST 3440	African-American History I	3 QH
HST 3441	African-American History II	3 QH
HST 3442	New Perspectives on American Slavery	3 QH
HST 3450	Boston As a City	3 QH
HST 3480	Seminar in American History	4 QH
HST 3481	Seminar in Colonial and Revolutionary America	4 QH
HST 3482	Seminar in American Governmental History	4 QH
HST 3483	Seminar in American Urban History	4 QH
HST 3484	Seminar in American Maritime History	4 QH
HST 3485	Seminar in African-American History	4 QH
HST 3486	Seminar in Recent American History	4 QH
HST 3501	History of Exploration	3 QH
HST 3503	Approaches to World History	3 QH
HST 3505	Canada and the United States	3 QH
HST 3508	Modern Africa	3 QH
HST 3510	History of the Islamic Peoples	3 QH
HST 3512	Modern Middle East	3 QH
HST 3523	Modern Japan	3 QH
HST 3529	Communism in China	3 QH
HST 3531	Population in History	3 QH
HST 3533	Psycho-History	3 QH
HST 3540	Economic History of the Modern Western World	3 QH
HST 3601	Historical Administration	3 QH
HST 3602	Historical Societies and Archives	3 QH
HST 3603	Historical Exhibits and Museums	3 QH
HST 3605	Historical Editing	3 QH
HST 3610	Industrial Archeology	3 QH
HST 3611	Historic Preservation	3 QH
HST 3620	Oral History	3 QH
HST 3621	Genealogical Research: Methods and Uses	3 QH
HST 3622	Local History Methodology	3 QH
HST 3625	Media and History	3 QH
HST 3805	Assigned Reading	1 QH
HST 3811	Thesis	9 QH
HST 3821	Fieldwork in History I	4 QH
HST 3822	Fieldwork in History II	4 QH
HST 3798	Master's Thesis Continuation	0 QH

Law, Policy, and Society

In the 1982 fall quarter, the Graduate School of Arts and Sciences at Northeastern University began offering an interdisciplinary program in law, policy, and society leading to the doctor of philosophy degree. Designed chiefly to help provide an interdisciplinary perspective on legal and social issues to those interested in social policy careers, the program is open to applicants who possess a master's degree in a social science or related field or have earned a law degree.

An optional program leading to the master of science degree in law, policy, and society is also available to students who have already earned a JD or who are enrolled in the Northeastern University School of Law and wish to pursue a combined MS/JD program of study.

The law, policy, and society programs are in response to the increasing demand for qualified people who have the interdisciplinary training necessary to deal effectively with those areas in which the concerns of social scientists merge with the interests of legal professionals.

Affiliated Faculty

African-American Studies

Holly Carter, PhD, *Massachusetts Institute of Technology*

Business Administration

Angelo J. Fiumara, JD, *Boston College*

Christine Hobart, DBA, *Harvard University*

Carl W. Nelson, PhD, *University of Manchester, England*

Criminal Justice

Romine Deming, PhD, *Iowa State University*

Theodore Ferdinand, PhD, *University of Michigan*

Edith Flynn, PhD, *University of Illinois*

James Fox, PhD, *University of Pennsylvania*

John Laub, PhD, *State University of New York, Albany*

Nicole Hahn Rafter, PhD, *State University of New York, Albany*

Economics

Neil Alper, PhD, *University of Pittsburgh*
Barbara Fraumeni, PhD, *Boston College*
Harold M. Goldstein, PhD, *Clark University*
Daryl A. Hellman, PhD, *Rutgers University*
Morris A. Horowitz, PhD, *Harvard University*
Gregory Wassall, PhD, *Rutgers University*

History

Ballard Campbell, PhD, *University of Wisconsin*
Donald M. Jacobs, PhD, *Boston University*
Clay McShane, PhD, *University of Wisconsin*

Human Development Professions

Susan Ellerin, PhD, *University of Pennsylvania*
Irene Nichols, EdD, *Harvard University*

Law School

Richard Daynard, LLB, *Harvard University*, PhD, *Massachusetts
Institute of Technology*
Daniel Givelber, LLB, *Harvard University*
Edward Greer, JD, *Yale Law School*
Stephen Subrin, LLB, *Harvard University*

Philosophy

Bart Gruzalski, PhD, *University of Maryland*
Stephen Nathanson, PhD, *Johns Hopkins University*

Political Science

Robert L. Cord, PhD, *Syracuse University*
Robert E. Gilbert, PhD, *University of Massachusetts*
Bruce M. Logan, PhD, *University of Chicago*
Eileen M. McDonagh, PhD, *Harvard University*

Sociology and Anthropology

Richard Bourne, PhD, *Harvard University*, JD, *Boston University*
M. Patricia Golden, PhD, *Cornell University*
Maureen Kelleher, PhD, *University of Missouri, Columbia*
Thomas H. Koenig, PhD, *University of California, Santa Barbara*
Elliot A. Krause, PhD, *Boston University*
Judith Perrolle, PhD, *Brown University*
Earl Rubington, PhD, *Yale University*
Michael Rustad, PhD, *Boston College*
Carmen J. Sirianni, PhD, *State University of New York, Binghamton*

Research

A number of research centers affiliated with the program provide students with opportunities to become familiar with current research issues and methodologies and, on occasion, hire students as research assistants.

The Center for Applied Social Research

Established in 1979, the center conducts interdisciplinary research in the social sciences on issues in criminal justice, public safety, mental health, social welfare, and education. Much of this work studies the relationship between the law and its impact on society and social behavior. William Bowers, PhD, is the director of the center.

The Center for Urban and Regional Economic Studies

This center recently has conducted research on the economic impact of a military installation on the neighboring region, has evaluated property tax relief in Connecticut, has examined the interrelationship between urban property values and urban crime control, and has investigated the nature and extent of violence in the Boston public schools. Daryl Hellman, PhD, is the director of the center.

The Center for Medical Manpower Studies

Since 1967, the center has conducted research on a wide variety of medical issues, including the costs of medical care, analysis of health-care plans, employment in the medical profession from nurses' aides to physicians, and the licensing and legal status of health-care professionals. Harold Goldstein, PhD, is the director of the center.

The Center for Labor Market Studies

The center conducts research and advises government agencies and nonprofit organizations on employment, training, and welfare. The staff has also provided technical assistance and training for government agencies and for employment and labor market programs. Andrew Sum is the director of the program.

Program Administration

The programs in law, policy, and society are administered by a graduate coordinator appointed by the dean of the College of Arts and Sciences. The graduate coordinator chairs the program curriculum committee, which consists of elected members from the College of Criminal Justice, School of Law, Boston-Bouvé College of Human Development Professions, and various departments within the College of Arts and Sciences. Advising, course development, thesis supervision, and other academic responsibilities are shared by faculty members affiliated with the program.

Admission

Students seeking admission to the PhD program in law, policy, and society must have completed a master's degree in a related discipline, such as economics, sociology, education, criminal justice, or legal history or have a recognized law degree. The MS program is offered to qualified individuals who hold a recognized law degree, while the combined MS/JD program is restricted to students accepted by Northeastern University's School of Law.

Applications to the program are considered for the fall quarter of each year. Application materials for the graduate programs in law, policy, and society may be obtained from the graduate coordinator of the program. To be considered for admission, applicants must submit an official copy of transcripts, indicating the award of prerequisite degrees as outlined above. In addition, a completed application, three letters of recommendation testifying to the student's ability to complete a graduate program, a statement explaining the applicant's interest in studying in the program, and official scores from the Graduate Record Examination (Aptitude Test only) or Law School Admissions Test are required. International students seeking admission to these programs should consult earlier sections of this catalog for information about additional requirements applying to them.

All application materials must be received no later than March 15 of the spring preceding the fall quarter for which admission is requested. Materials should be mailed to:

Law, Policy, and Society Graduate Coordinator
301 Lake Hall
Northeastern University
360 Huntington Avenue
Boston, Massachusetts 02115

Official scores from the Graduate Record Examination (Aptitude test only) or Law School Admissions Test should be forwarded to the office of the Graduate School of Arts and Sciences.

PhD Program in Law, Policy, and Society

Program

The program of study can be pursued on a full- or part-time basis, provided that all coursework is completed within three academic years. At least thirty-three quarter hours of graduate work beyond the master's or law degree is required for the PhD. This work must include sixteen quarter hours of work in core

requirements and a concentration comprising seventeen quarter hours.

Core Course Requirements

The following courses constitute the core requirement:

INT 3249–INT 3250		
	Law, Policy, and Society Survey	4 QH
LAW 2364	Legal Bibliography and Research	1 QH
ECN 3010	Introduction to Microeconomic Theory	3 QH
ECN 3511	Economics and the Law	1 QH
INT 3252–INT 3253		
	Critical Evaluation of Research	4 QH
	An elective in the Law School	3 QH

Students may petition the program curriculum committee to waive the requirements for Legal Bibliography and Research (LAW 2364) and Introduction to Microeconomic Theory (ECN 3010) by providing appropriate evidence of equivalent competency.

In fulfilling the core course requirements specified above, students are expected to demonstrate competence in statistical inference on a proficiency examination as a prerequisite to enrolling in Critical Evaluation of Research (INT 3253). Students who lack the required level of proficiency must take an appropriate course (e.g., ECN 3240, Soc 3115, ED 3341) to make up the deficiency; however, credits earned in such a course may not be counted toward the minimum thirty-three quarter hours required for the degree.

Concentration Requirements

The remainder of the doctoral program curriculum in law, policy, and society is organized within an area of concentration proposed by the student and developed in concert with a faculty adviser. A proposed concentration must be approved by the program curriculum committee and must bring several disciplinary perspectives to focus on one topical area of law, policy, and society studies. To fulfill concentration requirements, students must complete at least seventeen quarter hours of coursework selected from related areas in at least three affiliated academic units (departments or colleges). Each concentration may comprise general electives, chosen from those listed below, as well as courses more narrowly related to the specific topical area of interest. General electives are courses that have been identified as potentially relevant to any concentration area.

Several specimen concentrations are provided for illustration, below; others may be proposed. Students choosing to follow one of the sample concentrations have the opportunity to make additional specific course suggestions, in concert with their advisers, that are appropriate to their backgrounds and goals.

**Comprehensive
Qualifying
Examinations**

After completing the course requirements, each student must pass comprehensive qualifying examinations, consisting of two parts: (1) a written examination in the broad area of law, policy, and society, including relevant theoretical and methodological issues; and (2) an individual written examination or a state-of-the-art paper in the student's selected concentration area.

Degree Candidacy

Degree candidacy is established when the student has completed the minimum number of quarter hours required for the degree and has passed the comprehensive qualifying examinations.

**Language
Requirement**

Students are expected to demonstrate competency in one language, other than English, that is relevant to the study of law, policy, and society. Students must submit their choice of language to the program curriculum committee for approval. A demonstration of computer literacy may be substituted to fulfill this requirement.

Dissertation

An original doctoral dissertation is required of all doctoral students, in accordance with the general regulations of the Graduate School of Arts and Sciences. The student's thesis adviser and at least one other member of the thesis committee must have affiliate status in the law, policy, and society program.

**Final Oral
Examination**

In keeping with the academic requirements of the Graduate School of Arts and Sciences, doctoral candidates must also pass a final oral examination on the subject explored in their doctoral dissertation, including important developments in the field covered in the dissertation.

This examination is taken after the student has completed all other degree requirements and must be held at least two weeks prior to the commencement at which the degree is to be awarded.

MS Program in Law, Policy, and Society

Students accepted into the ms program or the combined ms/jd program must complete a minimum of forty quarter hours of graduate work, including the sixteen quarter hours of core course requirements and seventeen quarter hours of concentration requirements outlined for the doctoral program. Students in the combined ms/jd program may transfer no more than

seven quarter hours of law school coursework for credit toward the degree.

In addition to course requirements, students must pass the first part of the qualifying examinations described above to fulfill the requirements for the master of science degree in law, policy, and society.

General Elective Courses

The following general elective courses are recommended as being potentially relevant to any concentration area. Unless otherwise indicated, all courses carry three quarter hours of graduate credit. Students should consult the course listings of the North-eastern graduate schools to obtain complete course descriptions.

SOC 3120	Seminar in Qualitative Analysis I
SOC 3121	Seminar in Qualitative Analysis II
SOC 3186	Social Control I
SOC 3187	Social Control II
SOC 3206	Sociology of Law
SOC 3320	Multiple Regression in Sociological Analysis
SOC 3325	Sociology of Policy, Planning, and Evaluation
SOA 3355	Anthropology of Law and Conflict
SOC 3240	Formal Organizations
POL 3512	American Constitutional Law 1
POL 3514	American Constitutional Law 2
ECN 3150	Microeconomic Policy Planning Seminar
ECN 3241	Econometrics I
ECN 3383	Intergovernment Finance
ECN 3540	Econometrics II
CJ 3520	Conflict Management

Suggested Model Concentrations

The following model concentrations, including suggested coursework, are provided to illustrate the kinds of programs students may wish to design. The specific selection of coursework in any area, however, may be determined by the student and an academic adviser. Typically, a concentration consists of six courses.

The appropriate graduate school bulletin should be consulted for complete descriptions of courses suggested for model con-

centrations. Some courses offered by the Graduate School of Business Administration are among those suggested for specific areas. Students wishing to enroll in these courses should seek the permission of the Director of the Graduate School of Business Administration.

Environmental Protection

The social and legal implications of environmental management make up one of the more complex groups of issues confronting our society. A concentration in this area would focus on impacts of technology on the environment—noise, chemical pollution, and conservation—and the influences of the environment on individual and social well-being, particularly as these influences are mitigated by law.

Suggested Coursework

Biology

BIO 3617 Environmental Law

Economics

ECN 3361 Externalities

ECN 3365 Economics of Urban Transportation

ECN 3366 Economics of Intercity Transportation

Engineering

CIV 1660 Technology Assessment

Political Science

POL 3635 Environment & Energy Policy

Law

LAW 2105 Property

LAW 2300 Administrative Law

LAW 2329 Environmental Law

Sociology

SOA 3300 Cultural Ecology

Legal Issues in Health Care

This concentration reflects an increasing concern with health-related issues. Encompassing the legal and social ramifications of such topics as access for the handicapped, rights of medical consumers, health-care regulation, nationalized medicine, and euthanasia, this concentration is designed to foster an interdisciplinary perspective on the many legal issues involving health-care delivery in our society.

Suggested Coursework

Economics

ECN 3354 Economics of Medical Care & Health Manpower

Education

CRS 3435 Program Development in Rehabilitation

CRS 3439 Social Welfare and Rehabilitation

CRS 3445 Legal Aspects of Rehabilitation and Special Education

Business

- HRM 3784 Human Resource Management in Health Organizations
MGT 3982 Strategic Planning for Health Organizations

Political Science

- POL 3630 Health-Care Administration
POL 3644 Public Policy Issues in Human Services

Law

- LAW 2339 Involuntary Commitment of the Mentally Ill
LAW 2358 Welfare

Sociology

- SOC 3245 Sociology of Poverty
SOC 3200 Sociology of Alcoholism

**Legal Issues in
Human Resources
Utilization**

Legal issues in human resources utilization range from more traditional problems of fair labor practices and union/management roles and conflicts to more recent problems centering on equal opportunity and affirmative action. This concentration permits examination of these issues as well as questions concerning appropriate education and training policies. The focus in this area of study is on legal issues, social consequences, and social responsibility with respect to these problems.

*Suggested Coursework***Economics**

- ECN 3350 Economics of the Labor Market and Labor Force I
ECN 3351 Economics of the Labor Market and Labor Force II
ECN 3357 Human Resources Planning at State and Local Areas
ECN 3358 Economics of Education & Training Programs

Education

- ED 3328 Education and Equality

Business

- HRM 3972 Labor Relations
MGT 3720 Labor Law

Political Science

- POL 3644 Public Policy Issues in Human Services
POL 3647 Manpower Policy & Administration
POL 3669 Labor Relations in Public Administration
POL 3652 Civil Liberties in Public Administration
POL 3667 Equal Opportunity in Public Administration

Law

- LAW 2340 Labor Law I
LAW 2341 Labor Law II

Sociology

- SOC 3140 Sociology of Prejudice and Discrimination
SOC 3175 Sociology of Work
SOC 3176 Sociology of Occupations and Professions

The parallel problems of crime and deviant behavior have given rise to a vast network of public and private organizations, while calling forth a wide range of policies that influence both public and private behavior. Concentrating in this area involves an examination of the nature of crime and deviant behavior and the legal and social foundations of policy affecting criminal justice. This focus should be of value to the scholar interested in exploring the basis of deviance and the role of the criminal justice system, as well as to the administrator who seeks a better foundation for decisions in the criminal justice area.

Suggested Coursework

Criminal Justice

Crime Sequence

- CJ 3203 Criminal Law
- CJ 3505 Juvenile Law

Deviant Behavior Sequence

- CJ 3511 Theories of Delinquency
- CJ 3202 Theories of Criminology
- CJ 3529 Comparative Criminology
- CJ 3354 Criminal Behavior Systems
- CJ 3519 Organized Crime
- CJ 3517 Terrorism

Sociology

Crime Sequence

- SOC 3205 Sociology of Crime and Justice
- SOC 3190 Sociology of Delinquency
- SOC 3405 Theories of Criminology

Deviant Behavior Sequence

- SOA 3220 Culture and Mental Illness
- SOC 3185 Sociology of Deviant Behavior
- SOC 3200 Sociology of Alcoholism

Law

Crime Sequence

- LAW 2337 Juvenile Law
- LAW 2351 Prisoners' Rights

Deviant Behavior Sequence

- LAW 2339 Involuntary Commitment of the Mentally Ill

Economics

Crime Sequence

- ECN 3362 Economics of Crime

Education

Deviant Behavior Sequence

- ED 3306 Abnormal Psychology
- CRS 3406 Mental Health

Psychology

Crime and Deviant Behavior Sequence

- PSY 3324 Behavior Change in Institutions
- PSY 3171 Psychopathology I
- PSY 3271 Psychopathology II

Mathematics

The graduate program in mathematics is structured to provide students with a strong general foundation and proficiency in a particular area of specialization. Those who are admitted to the doctoral program find a versatile and active research faculty able to direct them in a variety of original research topics. The mathematical life at Northeastern University is often enlightened by the visit of eminent mathematicians to the University or to the Greater Boston area. Numerous departmental and regional seminars also give the student an opportunity to learn of the most recent and important advances in modern mathematics.

Professors

Maurice E. Gilmore, PhD, *University of California, Berkeley*,
Chairperson

Samuel J. Blank, PhD, *Brandeis University*

Bohumil Cenk, DSc, *Charles University, Prague, Czechoslovakia*

David I. Epstein, PhD, *New York University*

Holland C. Filgo, Jr., PhD, *Rice University*

Alberto R. Galmarino, PhD, *Massachusetts Institute of Technology*

Arshag Hajian, PhD, *Yale University*

Evelyn F. Keller, PhD, *Harvard University*

Nancy Kopell, PhD, *University of California, Berkeley*

Jayant M. Shah, PhD, *Massachusetts Institute of Technology*

Gabriel Stolzenberg, PhD, *Massachusetts Institute of Technology*

Jack Warga, PhD, *New York University*

Associate Professors

Shirley A. Blackett, MEd, *Pennsylvania State University*

Mark Bridger, PhD, *Brandeis University*

Gail A. Carpenter, PhD, *University of Wisconsin*

Bruce Claflin, MS, *Northeastern University*

Ron Donagi, PhD, *Harvard University*

Ellen H. Dunlap, BA, *University of California, Berkeley*

John N. Frampton, PhD, *Yale University*

Eugene H. Gover, PhD, *Brandeis University*

Samuel Gutmann, PhD, *Massachusetts Institute of Technology*
 Anthony Iarrobino, PhD, *Massachusetts Institute of Technology*
 Nishan Krikorian, PhD, *Cornell University*
 Richard D. Porter, PhD, *Yale University*
 Mark B. Ramras, PhD, *Brandeis University*
 Thomas O. Sherman, PhD, *Massachusetts Institute of Technology*
 Victor R. Staknis, PhD, *Boston University*
 Chuu-Lian Terng, PhD, *Brandeis University*

Assistant Professors

Margaret M. Bayer, PhD, *Cornell University*
 Robert W. Case, PhD, *Yeshiva University*
 Mo-Suk Chow, PhD, *Cornell University*
 Margaret Cozzens, PhD, *Rutgers University*
 Dom P. de Caew, PhD, *University of Toronto, Canada*
 Stanley J. Eigen, PhD, *McGill University, Montreal, Canada*
 Lenore Feigenbaum, PhD, *Yale University*
 Terence Gaffney, PhD, *Brandeis University*
 Laurence S. Gillick, PhD, *Massachusetts Institute of Technology*
 Mark Goresky, PhD, *Brown University*
 Solomon M. Jekel, PhD, *Dartmouth College*
 Donald R. King, PhD, *Massachusetts Institute of Technology*
 Zakhar G. Maymin, PhD, *Massachusetts Institute of Technology*
 Robert C. McOwen, PhD, *University of California, Berkeley*
 A. Prabhakar Rao, PhD, *University of California, Berkeley*
 Catherine Roche, PhD, *Northeastern University*
 Martin Schwarz, Jr., PhD, *New York University, Courant*
 Gordana G. Todorov, PhD, *Brandeis University*

Research

For the last several years, the Mathematics Department has established as priorities for the hiring of new research faculty the areas of statistics and applied algebra and analysis. Besides the important research studies being conducted in those fields, the department has strong and active research mathematicians in a variety of other areas. Below is a partial list of current research areas and some of the studies being undertaken. The order roughly follows that adopted by the *Mathematical Reviews*. The list constitutes a rich cross section of the whole mathematics.

- Foundations: Study of constructive mathematics.
- Combinatorics: Studies in applications of graph theory techniques to problems in such diverse areas as computer science, biology, psychology, and management science. Study

of computer implementation of algorithms arising in topology.

- Commutative algebra: Study of Artin algebras.
- Algebraic geometry: Study of Hodge theory and moduli problems. Study of moduli of stable rank-two bundles on P^3 .
- Lie theory: Structure and representation of Weyl groups. Noncommutative harmonic analysis on symmetrical spaces.
- Measure theory: Studies of ergodic theory.
- Optimal control theory: Studies of optimization and non-smooth analysis. (A faculty member is a member of the board of the *SIAM Journal on Control and Optimization*.)
- Partial differential equations: Study of elliptical partial differential equations on noncompact domains and manifolds.
- Differential geometry: Study of variational problems in differential geometry (minimal submanifolds, Einstein metric). Study of differential forms with applications to group lie algebras and their cohomologies. Study of Bäcklund transformations of chiral fields on Grassman and Stiefel manifolds.
- Algebraic topology: Tame homotopy theory.
- Statistics: Studies of statistical decision theory, pattern recognition, and industrial applications of statistics.
- Applied analysis: Studies of reaction-diffusion equations, spontaneous pattern formation in physics and chemistry, forced and complex oscillators, and theoretical neurobiology.

Admissions Requirements

Applicants for admission must satisfy the admissions requirements listed on page 24. In addition, they should have a background that includes courses in linear and modern algebra, mathematical analysis, and computer programming.

Students who have deficiencies in these areas may be accepted if their overall college work is judged satisfactory. However, they will be expected to learn the material during the first two quarters. Some of the courses may be taken at Northeastern University during the summer preceding enrollment. Students may also choose to enroll in the introductory courses or make individual arrangements with their advisers.

The Master of Science Degree

The Mathematics Department offers a program of study leading to the ms degree in mathematics. The program provides students the opportunity to pursue the option of an internship in one of the many high-technology industries and research laboratories located in the Boston area.

Areas of specialization are:

Applied mathematics
Computer science
Analysis/differential equations
Numerical analysis
Combinatorics
Topology/geometry
Algebra
Probability and statistics

Course Requirements Twelve graduate courses are required for the degree.
The three required courses are:

Analysis I
Algebra I (Linear Algebra)
Data Structures

Students must select six of the following courses, at least one of which must be among the first three listed:

Analysis II (Complex Variables)
Algebra II (Groups and Rings)
Computer Organization and Programming
Combinatorics (any one of three)
Analysis III
Topology I or Geometry (Foundations of)
Applied Mathematics (I or II, not both)
Differential Equations (P.D.E. or O.D.E. not both)
Probability I
Statistics I
Numerical Analysis I
A theoretical computer science course
An elective in the specialty
An elective not in the specialty

Three advanced courses are required in the specialty area: for example, students might take three advanced courses in:

Combinatorics/discrete mathematics
Computer science
Probability/statistics
Topology/geometry
Analysis
Algebra
Applied mathematics

Nearly all graduate courses in the Mathematics Department meet after 5 p.m., Monday to Thursday, so that students who

work during the day may take one or two courses each quarter at night.

After completing the ms degree, a student with an excellent academic record may apply for admission to Northeastern's PhD program in mathematics.

Part-Time Program

Students in this program may progress according to their abilities and available time, subject, of course, to the time limitation established by the Graduate School of Arts and Sciences. Students who are deficient in any of the mathematics courses required for admission to the degree program are required to satisfy their deficiencies by taking courses given for this purpose. Such courses carry graduate credit, but that credit is regarded as additional to regular degree requirements.

Other Requirements

There are no comprehensive examinations and no language requirements for the ms degree.

The Doctor of Philosophy Degree

Admission

Students who have completed the full-time master's degree program or who have obtained a master's degree at another institution are eligible for admission to the doctoral program. Students who wish to earn the doctoral degree should inform the chairperson of the graduate committee of their desire to be doctoral candidates. Those who have been accepted as doctoral candidates will remain in that category as long as their progress is deemed satisfactory.

Residence Requirement

The residence requirement is satisfied by one year of full-time graduate work.

Degree Candidacy

Degree candidacy is established in accordance with the general Graduate School regulations.

Course Requirements

The course requirements, in addition to the minimum master's degree requirement of forty-eight quarter hours of credit, are established by the departmental graduate committee for each candidate. In most cases, thirty-two quarter hours of additional work is required.

Independent Work

Before starting their dissertation, doctoral students may be required to do an independent project, possibly but not necessarily in conjunction with departmental seminars or courses. The

aim of the project is to start students on independent work and to give them a practical way to learn research techniques. The ms thesis is acceptable, for example.

Minor Specialty

Each doctoral candidate selects some specific mathematical subject of an advanced nature, which must be reasonably unrelated to the topic of the student's dissertation. By means of reading, lecture courses, and/or seminars, the student should render work in this area equivalent to a good part of one full year's coursework (twelve quarter hours). Approval of the area and the plan of work should be obtained in advance from the departmental graduate committee.

Language Requirements

Ability to read and translate mathematical texts and journals in one foreign language must be established by the candidate. The language may be chosen from French, German, and Russian; any other choice requires special approval. Students should notify the chairperson of the departmental graduate committee when they are prepared to be examined on a language. The examination is conducted by a member of the faculty of the Mathematics Department.

Teaching Requirement

Some teaching experience is required. This requirement may be satisfied by at least one year of service as a teaching assistant or by suitable teaching duties.

Dissertation

After the successful completion of their independent work (when required), students select a dissertation adviser, under whose guidance they write their doctoral dissertations. They may be assisted by the departmental graduate committee in that selection if they wish. The dissertation itself must represent an original solution of a problem in the chosen area of mathematics that makes some contribution to mathematical knowledge.

Final Oral Examination

The final oral examination on the dissertation is held in accordance with the Graduate School regulations.

Course Listings

The following is a listing of all departmental course offerings. Please refer to the *1984–1985 Graduate Schools Course Descriptions* for course descriptions and relevant prerequisites.

The following courses are offered for those who wish to enter the master's degree program in mathematics but who fail to satisfy the admissions requirements. These courses are taken in addition to the required coursework in mathematics.

Course No.	Course Name	Credit
MTH 3001	Abstract Algebra I	2 QH
MTH 3002	Abstract Algebra II	2 QH
MTH 3003	Abstract Algebra III	2 QH
MTH 3004	Advanced Calculus I	2 QH
MTH 3005	Advanced Calculus II	2 QH
MTH 3006	Advanced Calculus III	2 QH

The following courses may be used toward the degree requirements in mathematics, except for courses numbered from MTH 3200 to MTH 3299.

MTH 3011	A First Course in Mathematical Logic	2 QH
MTH 3012	An Introduction to Recursive Function Theory	2 QH
MTH 3013	Gödel's Incompleteness Theorem	2 QH
MTH 3014	Set Theory	2 QH
MTH 3015	Formal Set Theory	2 QH
MTH 3101	Analysis I	4 QH
MTH 3102	Algebra I	4 QH
MTH 3103	Analysis II	4 QH
MTH 3104	Algebra II	4 QH
MTH 3105	Topology I	4 QH
MTH 3106	Analysis III	4 QH
MTH 3107	Topology II	4 QH
MTH 3211	Information Systems I	2 QH
MTH 3212	Information Systems II	2 QH
MTH 3213	Information Systems III	2 QH
MTH 3221	Biostatistics	2 QH
MTH 3222	Applied Statistics	4 QH
MTH 3223	Biostatistics	3 QH
MTH 3230	Introduction to Computer Programming and Applications	2 QH
MTH 3231	Introduction to Computer Programming and Applications	4 QH
MTH 3302	Constructive Algebra	4 QH
MTH 3303	Set Theory	4 QH
MTH 3305	Philosophy of Science and Mathematics I	4 QH
MTH 3306	Philosophy of Science and Mathematics II	4 QH
MTH 3311	Mathematical Logic	4 QH
This course combines material of MTH 3011 and MTH 3013.		
MTH 3321	Algebra III	4 QH
MTH 3331	Homological Algebra	4 QH
MTH 3332	Commutative Algebra	4 QH
MTH 3341	Applied Mathematics I	4 QH
MTH 3342	Applied Mathematics II	4 QH
MTH 3351	Ordinary Differential Equations I	4 QH
MTH 3352	Ordinary Differential Equations II	4 QH
MTH 3356	Calculus of Variations	4 QH
MTH 3361	Numerical Analysis I	4 QH
MTH 3362	Numerical Analysis II	4 QH
MTH 3371	Optimal Control Theory	4 QH
MTH 3373	Optimization	4 QH
MTH 3380	Functional Analysis	4 QH
MTH 3386	Lie Theory	4 QH

Course No.	Course Name	Credit
MTH 3395	Dynamical Systems	4 QH
MTH 3405	Algebraic Topology	4 QH
MTH 3411	Differential Geometry	4 QH
MTH 3431	Probability I	4 QH
MTH 3432	Probability II	4 QH
MTH 3441	Statistics I	4 QH
MTH 3443	Statistical Decision Theory	4 QH
MTH 3444	Analysis of Variance	4 QH
MTH 3445	Topics in Statistics	4 QH
MTH 3501	Data Structures	4 QH
MTH 3502	Computer Organization and Programming	4 QH
MTH 3503	Compilers	4 QH
MTH 3504	Systems Programming	4 QH
MTH 3510	Data-Base Management	4 QH
MTH 3512	Concurrent Programming	4 QH
MTH 3521	Theory of Automata and Formal Language	4 QH
MTH 3522	Artificial Intelligence	4 QH
MTH 3525	Computer Communications System	4 QH
MTH 3527	Combinatorial Theory	4 QH
MTH 3528	Combinatorial System Analysis	4 QH
MTH 3529	Graph Theory	4 QH
MTH 3535	Algorithms and Complexity Theory	4 QH
MTH 3801	Seminar: Constructive Mathematics	4 QH
MTH 3806	Readings in Algebra	*
MTH 3807	Seminar in Algebra	*
MTH 3811	Readings in Analysis	*
MTH 3812	Seminar in Analysis	*
MTH 3818	Seminar: Dynamical Systems	*
MTH 3821	Readings in Topology	*
MTH 3822	Seminar in Topology	*
MTH 3826	Readings in Statistics and Probability	*
MTH 3831	Readings in Computer Science	*
MTH 3836	Seminar in Combinatorics	*
MTH 3850	Doctoral Dissertation	0 QH
MTH 3798	Master's Thesis Continuation	0 QH
MTH 3799	Doctoral Dissertation Continuation	0 QH

*Credit equal to as much as four quarter hours per quarter.

Physics

The Northeastern University Department of Physics offers opportunities for graduate students to work with internationally recognized faculty in a diverse range of front-line research programs in atomic and molecular physics, astrophysics, biophysics, condensed matter physics, and elementary particle physics.

The department offers both full- and part-time graduate programs leading to the MS degree and full-time programs leading to the PhD degree. Thesis work for the PhD degree may be undertaken in one of the department's research areas or in interdisciplinary areas such as material science and plasma physics. An additional option allows cooperative research in applied physics, in which the PhD thesis work is undertaken in a high-technology, medical, or nonprofit institution in the Boston area.

Professors

Ronald Aaron, PhD, *University of Pennsylvania*

Petros N. Argyres, PhD, *University of California, Berkeley*

Richard L. Arnowitt, PhD, *Harvard University*

Alan H. Cromer, PhD, *Cornell University*

William L. Faissler, PhD, *Harvard University*

Marvin H. Friedman, PhD, *University of Illinois, Urbana*

David A. Garelick, PhD, *Massachusetts Institute of Technology*

Marvin W. Gettner, PhD, *University of Pennsylvania*

Michael J. Glaubman, PhD, *University of Illinois, Urbana*

Hyman Goldberg, PhD, *Massachusetts Institute of Technology*

Walter Hauser, PhD, *Massachusetts Institute of Technology*

Giovanni Lanza, PhD, *University of Trieste*

Robert P. Lowndes, PhD, *University of London*

Bertram J. Malenka, PhD, *Harvard University*

Pran Nath, PhD, *Stanford University*

Clive H. Perry, PhD, *University of London*

Eugene J. Saletan, PhD, *Princeton University*

Carl A. Shiffman, PhD, *Oxford University*

Jeffrey B. Sokoloff, PhD, *Massachusetts Institute of Technology*

Yogendra N. Srivastava, PhD, *Indiana University*

Michael T. Vaughn, PhD, *Purdue University*

Eberhard von Goeler, PhD, *University of Illinois, Urbana*
Allan Widom, PhD, *Cornell University*
Fa Yueh Wu, PhD, *Washington University*

Associate Professors

Arun Bansil, PhD, *Harvard University*
Paul M. Champion, PhD, *University of Illinois, Urbana*
Jorge V. Jose, DSc, *National University of Mexico*
Marie Machacek, PhD, *University of Iowa*
Robert S. Markiewicz, PhD, *University of California, Berkeley*

Assistant Professors

George O. Alverson, PhD, *University of Illinois, Urbana*
Sara C. Beck, PhD, *University of California, Berkeley*
William Celmaster, PhD, *Harvard University*
John Chalupa, PhD, *University of Washington*
Ali H. Chamseddine, PhD, *University of London*
Narenda K. Jaggi, PhD, *University of Bombay*
Stephen W. McKnight, PhD, *University of Maryland*
Mark Novotny, PhD, *Stanford University*
Robert Polvado, PhD, *Indiana University*
W. David Shambroom, PhD, *Harvard University*

Research Associates

Henry Band, PhD, *Duke University*
Frederic Green, PhD, *Yale University*
Rajan Gupta, PhD, *California Institute of Technology*
Sahadat Hossain, PhD, *Tufts University*
Jorge H. Moromisato, PhD, *Northeastern University*
Athos Petrou, PhD, *Purdue University*

Areas of Advanced Study and Research

Experimental Condensed Matter Physics

Researchers in this area use a broad range of in-house experimental techniques, such as Mössbauer spectroscopy, far infrared and laser Raman spectroscopy, and high-pressure and low-temperature devices, including superconducting quantum interference devices (SQUIDS). Researchers are also involved off campus in high magnetic field studies at the National Magnet Laboratory and in neutron spectroscopy studies at the Brookhaven and Oak Ridge National Laboratories.

Current research topics include infrared and optical studies of semiconductors; metals and metallic glasses as a function of temperature and pressure; transport phenomena in metals and semiconductors in low to very high magnetic fields; pressure dependence of electron-phonon scattering rates; x-ray, optical, and Fermi surface studies of intercalated graphites; two-dimensional physics and localization in ultrathin metallic films;

magneto-optical studies of two-dimensional electron superlattices and single interfaces; neutron scattering in two-dimensional magnetic systems and in weakly itinerant ferromagnets; infrared, Raman, and neutron spectroscopy of fast ion conductors; intermolecular interactions in fluids at high densities, and very low temperature Mössbauer spectroscopy of the hyperfine interaction in mixed valence systems.

Theoretical Condensed Matter Physics

Research interests of this group include statistical mechanics; theory of phase transitions; low-temperature physics; theory of Josephson junctions; quantum circuits; quantum optics; Fermi liquid theory; localization and percolation in disordered systems; soliton and chaotic solutions of nonlinear systems; charge density waves; magnetism; electromagnetic and elastic properties of solids, optical properties of metals; transport theory; quantum chaos; and transport properties of disordered systems.

Experimental High-Energy Physics

The high-energy experimental group is presently taking part in three major experimental efforts at three different centers for high-energy physics. One group is collecting and analyzing data from the magnetic calorimeter (MAC) that is in operation at the electron-positron colliding beam facility (PEP) at Stanford University. A second group is participating in the construction of a large multi-particle spectrometer, which will be used in one of the first experiments to be run at the Tevatron now being built at the Fermi National Accelerator Laboratory. This detector will have excellent photon-detecting ability and will be used to carry out several experimental tests of quantum chromodynamics. A third group is participating in the construction of a large experiment to run at the electron-positron colliding beam facility (LEP) being built at CERN in Geneva, Switzerland. When this facility goes into operation, it will be the leading electron-positron facility in the world.

Theoretical Elementary Particle Physics

Research interests cover a range of topics, including unified gauge theories of weak, electromagnetic, and strong interactions; particle physics in the early universe; phenomenology of supersymmetrical models; supergravity unified models; lattice gauge theory; computational physics, phase transitions and spontaneous symmetry breaking; finite temperature effects in quantum chromodynamics; renormalization group analyses of coupled field systems; and phenomenology of high-energy physics.

Research Facilities

The department is housed in the Dana Research Center, a modern, air-conditioned building with its own library, ample research laboratories, a machine and electronics shop, conference and seminar rooms, and faculty and graduate student offices. The department has its own VAX 750 computer facility, as well as facilities providing access to the University Computer Center.

Faculty and graduate students are also currently engaged in experiments off campus at the Fermi National Accelerator Laboratory (Fermilab), the Stanford Linear Accelerator Center (SLAC), the National Magnet Laboratory, the Brookhaven National Laboratory, the Oak Ridge National Laboratory, and the Laue-Langevin Institute, Grenoble, France.

Procedure for Admission

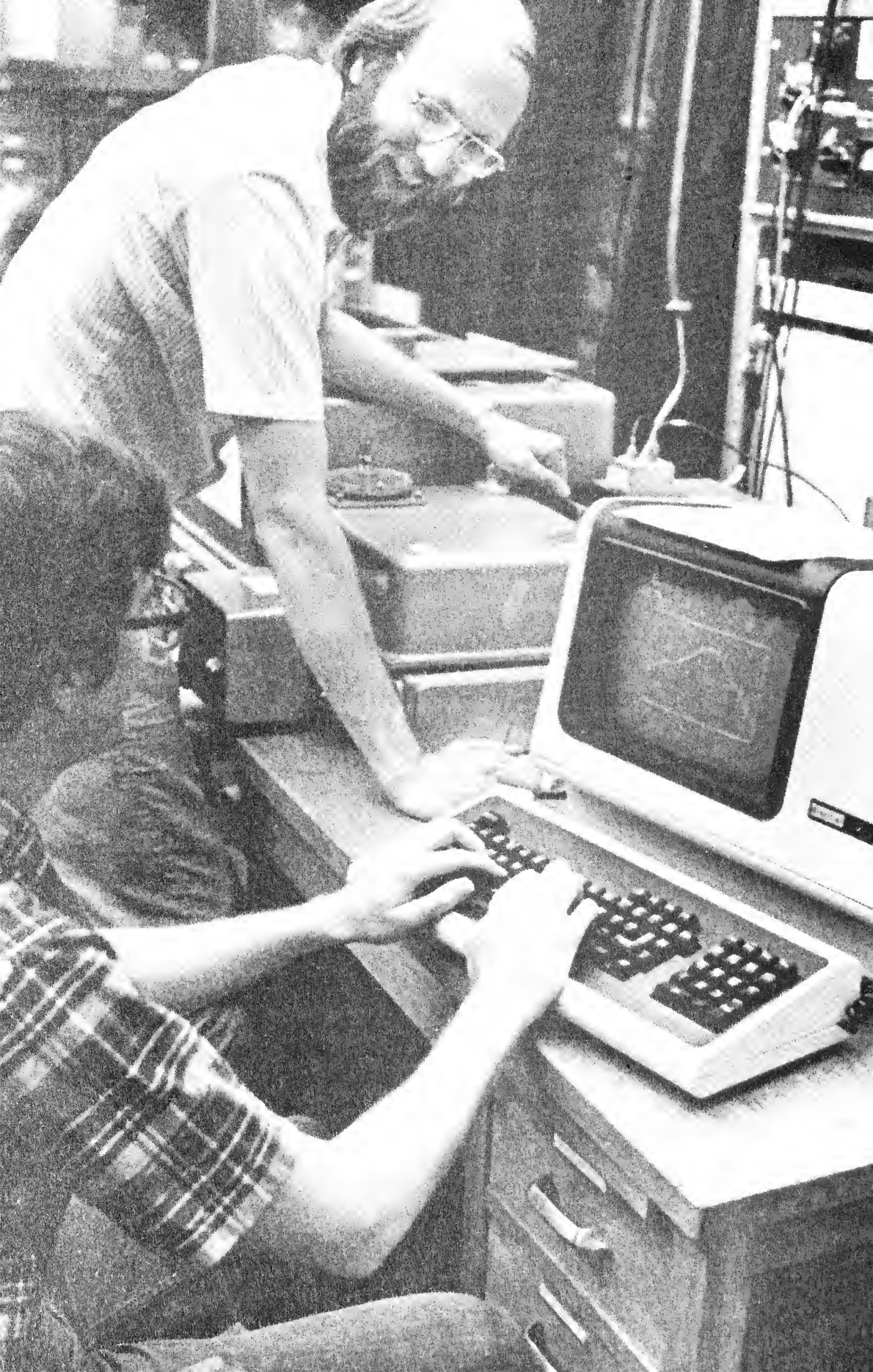
All requests for information and application forms should be sent to the graduate director of the Physics Department. Completed applications and related materials, such as transcripts, letters of recommendation, and Test of English as a Foreign Language (TOEFL) scores (where applicable) should also be sent to the graduate director. Graduate Record Examination (GRE) scores should be sent to the Graduate School of Arts and Sciences office.

In addition to meeting the general requirements of the Graduate School of Arts and Sciences, applicants for admission to the graduate programs must have had an undergraduate program that included the equivalent of at least twelve semester hours of upperclass physics beyond general physics and courses in calculus and ordinary differential equations.

To qualify as a regular student, the applicant should have completed upperclass courses in mechanics, electricity and magnetism, thermodynamics, modern physics, and quantum mechanics, as well as mathematical methods courses covering advanced calculus, linear vector spaces, and functions of a complex variable. Students whose background in one or more of these areas is weak may be required to satisfy prerequisites to the graduate courses by completing up to nine quarter hours of introductory courses.

Students with undergraduate majors in fields other than physics may be admitted as provisional students, with entry to the regular program conditional upon the satisfactory completion of an appropriate group of undergraduate courses. Except for the introductory courses, these courses do not carry regular graduate credit.

The applicant is encouraged to take the GRE (both the aptitude section and the advanced physics section); scores should be sent to the Graduate School of Arts and Sciences office.



International students are required to present evidence of sufficient competence in the English language to pursue the graduate program. For students whose previous instruction has been in a language other than English, this is normally done by submitting to the Physics Department results of the TOEFL examination or other evidence in accordance with the Graduate School regulations.

Assistantships

A number of assistantships are available for full-time graduate students.

Teaching Assistantships

These awards offer a stipend plus a remission of tuition for a regular graduate courseload in exchange for half-time work teaching in the undergraduate laboratories or equivalent work.

Tuition Assistantships

These awards provide remission of tuition for a regular graduate courseload in exchange for approximately eight hours per week of grading assignments or similar work. Holders of these awards are eligible to become teaching assistants if such positions become available.

Research Assistantships

These awards, normally given to advanced students, provide the same benefits as teaching assistantships in exchange for work (usually related to the student's thesis research) on one of the research projects in the department.

Physics Fellowships

The Physics Department awards four physics fellowships annually to students judged to be outstanding scholastically. These fellowships carry with them an honorarium, which is received in addition to the teaching or research assistantship stipend.

The Programs

The graduate programs in physics lead to the degrees of doctor of philosophy (PhD) and master of science (MS). In addition, the MS degree can be obtained with a concentration in instrumentation or a concentration in optics. The PhD program requires a full-time commitment, but the MS programs can be pursued on either a full-time or a part-time basis.

Each student admitted to the graduate program must be interviewed by a departmental adviser before registration for the first quarter at Northeastern, in order to assess the student's background and arrange for a suitable program of study.

The Master of Science Degree

Course Requirements

There are three options for the ms degree: the standard ms, the ms with a concentration in instrumentation, and the ms with a concentration in optics. Irrespective of the option chosen, forty-two quarter hours of graduate credit are required for the ms degree, of which up to twelve quarter hours may be transfer credit on departmental approval (subject to the general regulations of the Graduate School).

The ms degree options involve a common set of physics graduate courses, consisting of the following:

PHY 3601	Mathematical Methods A
PHY 3603	Classical Mechanics
PHY 3611, PHY 3612	Electromagnetic Theory A, B
PHY 3621, PHY 3622	Quantum Theory A, B

In addition to these required core courses, the three degree options have the following additional requirements:

MS (Standard Degree)

PHY 3605	Computational Physics
PHY 3623	Quantum Theory C

The remaining twelve quarter hours may be chosen from any courses carrying graduate credit in physics, biology, chemistry, engineering, mathematics, or psychology. Of these twelve quarter hours, not more than nine quarter hours of credit may be used in approved introductory physics courses (PHY 1305, Thermodynamics and Kinetic Theory; PHY 1412, Plasma Physics; PHY 1413, Introduction to Nuclear Physics; PHY 1414, Introduction to Solid State Physics; PHY 1415 and PHY 1416, Quantum Mechanics I and II; and PHY 3551 and PHY 3552, Electronics for Scientists I and II).

MS with a Concentration in Instrumentation

PHY 3605	Computational Physics
PHY 3551, PHY 3552	Electronics for Scientists I and II
PHY 3557	Advanced Laboratory
PHY 3561	Project Laboratory

MS with a Concentration in Optics

PHY 3623	Quantum Theory C
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In addition, students must take twelve quarter hours of credit from the following courses:

ECE 3511, ECE 3512	Lasers I, II
ECE 3513	Laser Applications
ECE 3661	Optical Storage and Display
ECE 3662, ECE 3663	Electro Optics I, II
ECE 3664, ECE 3665, ECE 3666	Fourier Optics I, II, III
ECE 3667, ECE 3668, ECE 3669	Optical Properties of Matter I, II, III
ECE 3672, ECE 3673	Principles of Optical Detectors I, II

The remaining four quarter hours may be chosen from any courses carrying graduate credit in physics or from optics-related courses.

Sample Course Program for Part-Time Students for Standard MS Degree

	Fall	Winter	Spring
Year I	Elective	PHY 1415	PHY 1416
		Quantum Mechanics I	Quantum Mechanics II
Year II	PHY 3601	PHY 3603	PHY 3605
	Mathematical Methods A	Classical Mechanics	Computational Physics
Year III	PHY 3611	PHY 3612	Elective*
	Electromagnetic Theory A	Electromagnetic Theory B	
Year IV	PHY 3621	PHY 3622	PHY 3623
	Quantum Theory A	Quantum Theory B	Quantum Theory C

A part-time student can expect to complete the requirements for the ms degree in four years at the rate of one three- or four-quarter hour course per quarter, or sooner by taking extra courses in some years or by taking courses in the summer quarter.

The Doctor of Philosophy Degree

The program for the PhD degree consists of required coursework, a qualifying examination, the completion of a dissertation based upon original research performed by the student, and a final oral examination.

Course Requirements

The required courses are grouped into two sets: part 1 and part 2. Part 1 courses are taken prior to the qualifying examination, and part 2 courses are taken after passing the qualifying examination. In addition, it is strongly recommended that at least one advanced graduate course from the set in part 3 be taken after the satisfactory completion of the part 2 courses; at his/her option, a student may take the part 3 courses on a pass/fail basis.

*Students intending to enter the PhD program should take PHY 3613, Electromagnetic Theory C, in the spring quarter.

The three sets of courses are as follows:

Part 1

PHY 3601	Mathematical Methods A
PHY 3603	Classical Mechanics
PHY 3605	Computational Physics
PHY 3611, PHY 3612, PHY 3613	Electromagnetic Theory A, B, C
PHY 3621, PHY 3622, PHY 3623	Quantum Theory A, B, C

Part 2

PHY 3624	Advanced Quantum
PHY 3631, PHY 3632, PHY 3633	Statistical Physics A, B, C
PHY 3641, PHY 3642	Solid State Physics A, B
PHY 3651, PHY 3652	Particle & Nuclear A, B

Part 3

PHY 3643, PHY 3644, PHY 3645	Advanced Solid State Physics A, B, C
PHY 3653, PHY 3654, PHY 3655	Particles, Currents & Fields A, B, C
PHY 3661, PHY 3662, PHY 3663	Many Body A, B, C
PHY 3671, PHY 3672, PHY 3673	General Relativity; Relativistic Astrophysics; Quantum Gravity

Sample Course Program for Full-Time Students*

	Fall	Winter	Spring
Year I	PHY 3601 Mathematical Methods A PHY 3611 Electromagnetic Theory A PHY 3621 Quantum Theory A	PHY 3603 Classical Mechanics PHY 3612 Electromagnetic Theory B PHY 3622 Quantum Theory B	PHY 3605 Computational Physics PHY 3613 Electromagnetic Theory C PHY 3623 Quantum Theory C
Year II	PHY 3631 Statistical Physics A PHY 3624 Advanced Quantum	PHY 3632 Statistical Physics B PHY 3651 Particle & Nuclear A PHY 3641 Solid State Physics A	PHY 3633 Statistical Physics C PHY 3652 Particle & Nuclear B PHY 3642 Solid State Physics B

Grade Requirements

The grade requirements for the successful completion of part 1, and hence for entry into the qualifying examination, are at least a B average in the part 1 courses. The grade requirements for the successful completion of part 2, and hence for formal entry into the thesis research, are at least a B average in the part 2 courses.

The part 2 courses, including any makeup of grade average deficiencies (see below), must be completed within two calendar years of passing the qualifying examination. Under mitigating circumstances, a student may petition the Committee on Academic Standing of Graduate Students (CASGS) to extend this time limit. Such a petition must be filed and approved by CASGS before the required two-year period from the successful completion of the qualifying examination has elapsed in order for the student to remain in the graduate program.

*A student who is required to take one or more introductory courses to satisfy prerequisites will normally need three years to complete the required courses for the PhD. Individual programs must be worked out in consultation with a departmental adviser.

In the event that a student fails to achieve the required B average for the part 1 courses, he/she must petition CASGS in order to remain in the graduate program. After carefully reviewing the academic performance of any student filing such a petition, CASGS will either not approve the petition or will place the student on academic probation pending the successful completion of a program established by CASGS for the student to clear his/her grade average deficiency.

In the event that a student fails to achieve the required B average for the part 2 courses, he/she must petition CASGS in order to remain in the graduate program. The final decision of CASGS will then be determined by the result of a special examination in the course(s) determined by CASGS to be the most serious contribution(s) to the grade average deficiency. Whenever possible, the examination(s) will be prepared and graded by the student's instructor(s) in the course(s) concerned.

Qualifying Examination

In addition to the grade requirements described above, the qualifying examination is also a requirement for the PhD degree. The qualifying examination, which may include both written and oral parts, will be based only on the material covered in the part 1 courses. The examination will be given only once each year, in the orientation week immediately preceding the fall quarter. A student may have only two attempts to pass the qualifying examination. In the event that a student fails the qualifying examination twice, he/she will automatically be terminated from the graduate program.

All students who have completed part 1 courses with a B average or who have successfully completed an academic probation program established by CASGS are eligible to take the qualifying examination and must take the examination at the first available opportunity. Upon successful completion of the qualifying examination requirement, a student must acquire a research adviser.

Part-time students who wish to become PhD candidates may so indicate by a petition to the graduate committee of the department; the petition must include a timetable for completing the required courses and taking the qualifying examination.

Advanced Standing

A student may be admitted into the PhD program with advanced standing based upon graduate courses taken elsewhere. Transfer credit will depend on departmental approval (subject to the general regulations of the Graduate School). However, the PhD qualifying examination must be taken at Northeastern, and the residence requirement must be satisfied.

Residence Requirement	A student who has completed the required coursework and passed the qualifying examination becomes a doctoral degree candidate and must satisfy the residence requirement by one year of full-time graduate work.
Teaching Requirement	Some teaching experience is required. This requirement may be satisfied by at least one year of service as a teaching assistant or by other teaching duties.
Work-Study Option	<p>A PhD candidate may spend one year in a participating high-technology, industrial, or government laboratory immediately after passing the PhD qualifying examination. In this program, the student is expected to remain in touch with the University by taking one course per quarter at the University and by frequent contact with a faculty adviser. After the one-year paid internship, the student returns to the University to do the dissertation.</p> <p>Eligibility for this program is contingent on acceptance both by the department and by the external laboratory involved.</p>
Dissertation	<p>The student should arrange for a dissertation adviser prior to taking the qualifying examination.</p> <p>The student may choose a field of research:</p> <ul style="list-style-type: none"> ■ In one of the research areas in the department, under direct supervision of the adviser. ■ In an interdisciplinary research field involving another research area of the University, under the direct supervision of a researcher in that field. In this case, an interdisciplinary committee is formed, consisting of the direct supervisor, the departmental adviser, and one other member of the department. ■ In an area of applied research in one of the industrial or high-technology laboratories associated with the department's industrial PhD program. The direct supervisor is associated with the institution where the research is performed. In this case, a dissertation advisory committee is established consisting of the direct supervisor, the departmental adviser, and one other member of the department. <p>An outline of the dissertation must be approved by the department at least eight months before the final oral examination.</p>
Final Oral Examination	The final oral examination is held in accordance with the Graduate School regulations.

Course Listings

The following is a listing of all departmental course offerings. Please refer to the 1984–1985 *Graduate Schools Course Descriptions* for course descriptions and relevant prerequisites.

Course No.	Course Name	Credit
PHY 3401	Radiation Physics	2 QH
PHY 3402	Radiation Biology	2 QH
PHY 3551	Electronics for Scientists I	4 QH
PHY 3552	Electronics for Scientists II	4 QH
PHY 3557	Graduate Advanced Laboratory	4 QH
PHY 3561	Graduate Project Laboratory	4 QH
PHY 3601	Mathematical Methods A	4 QH
PHY 3602	Mathematical Methods B	4 QH
PHY 3603	Classical Mechanics	4 QH
PHY 3605	Computational Physics	4 QH
PHY 3611	Electromagnetic Theory A	3 QH
PHY 3612	Electromagnetic Theory B	3 QH
PHY 3613	Electromagnetic Theory C	3 QH
PHY 3621	Quantum Theory A	4 QH
PHY 3622	Quantum Theory B	4 QH
PHY 3623	Quantum Theory C	4 QH
PHY 3624	Advanced Quantum Theory	4 QH
PHY 3631	Statistical Physics A	3 QH
PHY 3632	Statistical Physics B	3 QH
PHY 3633	Statistical Physics C	3 QH
PHY 3641	Solid State Physics A	4 QH
PHY 3642	Solid State Physics B	4 QH
PHY 3643	Advanced Solid State Physics A	4 QH
PHY 3644	Advanced Solid State Physics B	4 QH
PHY 3645	Advanced Solid State Physics C	4 QH
PHY 3651	Particle & Nuclear A	4 QH
PHY 3652	Particle & Nuclear B	4 QH
PHY 3653	Particles, Currents & Fields A	4 QH
PHY 3654	Particles, Currents & Fields B	4 QH
PHY 3655	Particles, Currents & Fields C	4 QH
PHY 3661	Many Body Theory A	4 QH
PHY 3662	Many Body Theory B	4 QH
PHY 3663	Many Body Theory C	4 QH
PHY 3671	General Relativity	4 QH
PHY 3672	Relativistic Astrophysics	4 QH
PHY 3673	Quantum Gravity	4 QH
PHY 3811	Reading Course	1 QH
PHY 3812	Reading Course	1 QH
PHY 3813	Reading Course	1 QH
PHY 3821	Reading Course	2 QH
PHY 3822	Reading Course	2 QH
PHY 3823	Reading Course	2 QH
PHY 3831	Reading Course	3 QH
PHY 3832	Reading Course	3 QH
PHY 3833	Reading Course	3 QH
PHY 3841	Reading Course	4 QH
PHY 3842	Reading Course	4 QH
PHY 3843	Reading Course	4 QH
PHY 3890	Master's Thesis I	4 QH
PHY 3891	Master's Thesis II	4 QH
PHY 3895	Doctoral Dissertation	0 QH
PHY 3798	Master's Thesis Continuation	0 QH
PHY 3799	Doctoral Dissertation Continuation	0 QH

Political Science

Although it is one of the oldest disciplines, political science is one of the most recently developed social sciences. As a discipline, political science entails the study of the origins, structures, and evolution of governments; the decision-making processes of political institutions; the means by which governments seek to manage conflicts; and the ways in which governments ought to be constituted and function.

Political science adopts the scientific, or quantitative, approach, when appropriate, yet is also concerned with historical developments, institutional descriptions, political trends, and normative values. In a very real sense, it is a blend of the oldest and newest methodologies and draws on other relevant disciplines to further its research and development.

Professors

Robert E. Gilbert, PhD, *University of Massachusetts, Chairperson*

Robert L. Cord, PhD, *Syracuse University*

David E. Schmitt, Edward W. Brook Professor, PhD, *University of Texas*

Associate Professors

L. Gerald Bursey, PhD, *Harvard University*

Minton F. Goldman, PhD, *Fletcher School of Law and Diplomacy*

Eileen L. McDonagh, PhD, *Harvard University*

Suzanne Ogden, PhD, *Brown University*

Assistant Professors

Stephen F. Coleman, PhD, *Boston University*

Malcolm L. Cross, PhD, *University of Missouri*

David A. Dickson, PhD, *Harvard University*

Margaret E. Leahy, PhD, *University of Southern California*

Bruce M. Logan, PhD, *University of Chicago*

William F. S. Miles, PhD, *Fletcher School of Law and Diplomacy*

Donald J. Reaves, PhD, *Kent State University*

Stewart Reiser, PhD, *Harvard University*

David Rochefort, PhD, *Brown University*

Harry Wessel, PhD, *State University of New York, Buffalo*

Lecturer

Christopher J. Bosso, MA, *University of Pittsburgh*

Part-Time Faculty

Rev. Edward F. Boyle, MBA, *Amos Tuck School of Business Administration*

Holly M. Carter, PhD, *Massachusetts Institute of Technology*

Ernest W. Cook, PhD, *Ohio State University*

Maxim Dem'Chak, MPA, *Northeastern University*

Gavan Duffy, SM, *Massachusetts Institute of Technology*

Richard K. Ghere, PhD, *Wayne State University*

Richard M. Gladstone, MCP, *University of Cincinnati*

Dianne J. Harris, PhD, *University of Michigan*

Katherine A. Hesse, JD, *Boston University*

Robert C. Johnson, Jr., JD, *Cornell University*

Stephen F. Kenney, PhD, *Boston University*

Paul G. Keough, MPA, *Northeastern University*

Claude G. Lancome, JD, *Harvard Law School*

Fern O. Marx, PhD, *Brandeis University*

Robert H. McClain, Jr., MS, *University of Denver*

Edward M. Meehan, MA, *Northeastern University*

Richard B. Morrison, EdD, *Boston University*

Robert J. M. O'Hare, MS, *Boston University*

J. Richard Poulin, MPA, *University of Oklahoma*

Carl A. Prussing, MPA, *University of New Hampshire*

Marvin M. Siflinger, MPA, *Syracuse University*

Michael L. Simmons, MPA, *Northeastern University*

Wallace E. Stickney, MPA, *Harvard University*

Marilyn Swartz-Lloyd, MCP, *Yale University*

Ernest J. Zupancic, MPA, *Princeton University*

Research

The research interests of political science faculty members at Northeastern are varied and far-reaching and draw on multiple methodologies. Recent faculty publications include an analysis of the separation of church and state controversy; an investigation that links stress and achievement patterns to mortality levels of American Presidents; an examination of China's role at the United Nations; a study of American health policy; an examination of the impact of television debates on the outcome of presidential elections and of television on the exercise of presidential power; an analysis of American policy toward Soviet intervention in Afghanistan; a study of the Kennedy Administration's civil rights record; an analysis of the Israeli police; an examination of the public bureaucracy; an exploration of Third World politics; and a study of the police and the state.

Several published research projects have used more heavily quantitative techniques, such as one that focused on the

achievement patterns of women, another that explored the process of political socialization and attitude change, and a third that studied the political affiliations of Arab students.

The published research of the faculty is complemented by its ongoing research efforts. Faculty members currently are conducting research in such diverse areas as comparative studies of women; enterprise zone strategy; the presidencies of Lincoln, Coolidge, and Franklin Roosevelt; ethnic conflict in the United States and Northern Ireland; the development and processes of the Office of Management and Budget; a cross-national analysis of the relationship between different forms of social and defense spending; the Israeli arms industry; forms of political patronage; unresolved issues in Chinese politics; the battle for women's suffrage; and the street-level police officer as a political decision maker.

Admission

Master of Arts

In addition to the admissions requirements listed on page 24, applicants for the master of arts program should have at least six semester hours of political science, government, or related courses. Test of English as a Foreign Language (TOEFL) scores are required for international applicants.

Master of Public Administration

Different procedures govern admissions for those with public sector status and those with non-public sector status. Public sector status includes those working for federal, state, city, county, or town governments; military personnel and veterans (regular and reserve); and those working for nonprofit or public service organizations. All others are considered non-public sector applicants.

Public sector applicants must be employed in the public sector at the time of admission and are automatically admitted as part-time provisional students. Matriculation into the program is granted upon obtaining a B average (3.000) in the first four Public Administration courses, two of which must be core courses.

All public sector applicants must submit a completed application form, application fee, official transcripts from each college or university where undergraduate or graduate degrees or credits were earned, and a letter confirming their public sector status.

Non-public sector applicants should demonstrate a clear and strong interest in public administration. In addition to the admissions requirements listed on page 24, applicants must furnish a statement supporting their interest in this field and outlining their reasons for wishing to enter this program. Al-

though most candidates for the MPA program come with a major concentration in the social sciences, such a background is not mandatory, and applicants from other fields, such as engineering, law, sciences, or business administration, are considered for candidacy. TOEFL scores are required for international applicants.

All applicants to political science or public administration graduate programs, including persons seeking special (non-degree) status, must follow the regular admissions procedures.

International Student Admission/English Language Assessment

In order to ensure that all international students have the English language skills necessary for graduate-level work, the Department of Political Science has a carefully devised plan of study. All international students recommended for admission initially receive a conditional status, pending English language diagnostic assessment. Conditional status indicates that the student may not be admitted to a degree candidacy until specified language requirements are met.

Diagnostic assessment is conducted by the English Language Center in conjunction with the Department of Political Science prior to registration for courses. On the basis of English language test assessment, international students are advised on an appropriate plan of study. Students who are determined as having the requisite English language skills for graduate work immediately obtain a regular student status and are admitted to graduate coursework and degree candidacy. Students whose English language assessment indicates a need for additional English language study are advised on the combination of graduate courses and English language courses needed for at least the first year of study. In cases in which international students demonstrate a pressing need for English language study, it is required that English language courses be taken prior to any graduate-level work in the Department of Political Science.

International students who have a degree from an institution abroad where the medium of instruction is English or who have an undergraduate degree from an American college or university (as stated on page 25) are exempt from the above stated language assessment.

The Master of Arts Degree

Program

Forty-two quarter hours of academic work is required. With the approval of the MA committee chairperson, a maximum of nine quarter hours may be selected from graduate courses in other

departments and a maximum of eight quarter hours may be selected from advanced undergraduate courses. The undergraduate courses also require the approval of the Director of the Graduate School of Arts and Sciences.

A thesis is optional with the approval of the MA committee. If approved, a thesis carries up to nine quarter hours of credit.

Comprehensive Examination

The comprehensive examination is held in accordance with the general Graduate School regulations. Every candidate for the degree must pass examinations in two fields as prescribed by the department. Degree candidates are limited to two attempts at successful examinations in each field. Choice may be made from the following concentration areas: American government and politics, comparative government and politics, international relations, political theory, and public administration.

MA Concentrations

American Government and Politics

The field of American government and politics is concerned with developing an understanding of the structure of American political institutions as well as those political processes that result from interactions among and within institutions. Students concentrating in this field should gain an appreciation for the historical foundations of American political institutions and processes, an understanding of the normative issues revolving around the difficulties involved in making the ideals of democracy practical realities, and a thorough knowledge of basic institutions such as the presidency, Congress, and the judiciary.

Comparative Government and Politics

The comparative government graduate curriculum of course offerings and required readings is intended to provide students with an understanding of the methods of comparative political inquiry and an in-depth mastery of political organization and behavior in selected geographical areas. This curriculum includes the study of theoretical and cross-national problems, contemporary political development, and institutional analyses of different types of governmental systems in different regional settings.

International Relations

The field of international relations examines the actors, issues, and actions that have impacts beyond national boundaries, in order to define these phenomena, explain the historical and present patterns of their occurrence, and illuminate the contexts in which certain patterns are likely to be experienced.

Specializations within the field of international relations include issues of war and peace, U.S.-Soviet relations, and regional area studies.

Political Theory

The field of political theory encompasses the wide span of historical and intellectual contributions delineating the nature of humans in relation to social, economic, political, and legal institutions, as well as psychological and cultural factors. Both the context in which the theories were generated and the applications and consequences of those theories are explored. Thus, the field of political theory analyzes the intellectual legacy of our Western civilization from the vantage point of both a theoretical and a practical orientation.

Public Administration

The public administration curriculum is designed to develop an understanding of what is required to function effectively as a public manager. It integrates theoretical foundations with some practical skills and seeks to promote a sense of the ethical and democratic responsibility entailed in being a public manager. It focuses attention on the academic study of public administration as a subfield of political science from the perspective of public organization and management, public finance and budgeting, public personnel administration, state and urban government, policy sciences, and development administration.

The Master of Public Administration Degree

Program

Forty-five quarter hours of academic work is required. All students must complete the following eight courses:

CPOL 3600	Survey of Public Administration
CPOL 3601	Public Personnel Administration
CPOL 3602	Organizational Theory & Management
CPOL 3603	Public Financing & Budgeting
CPOL 3604	Techniques of Policy Analysis
CPOL 3605	Quantitative Techniques for Public Administration 1
CPOL 3606	Quantitative Techniques for Public Administration 2
CPOL 3607	Quantitative Techniques 3: Computer Applications

At least five additional courses must be selected from courses designated as public administration electives. A maximum of four courses may be selected from courses in the Master of Arts program in political science or from other graduate programs at Northeastern as substitute elective courses. These courses must have the prior approval of the MPA committee chairperson.

All students beginning the MPA program who have not had an introductory American government course at the undergraduate level are required to take CPOL 3502, Seminar in American Government. Students entering the program who have not completed an undergraduate-level course in economics are required to take CECM 3111, Economics for Public Administrators.

MPA Concentrations

Students may elect to declare an MPA concentration after completing the core courses. The concentrations seek to provide integrated course offerings in key public administration fields. Each concentration area is coordinated by a full-time faculty member, who also serves as adviser to students in his/her area of concentration. There are four required courses in each concentration, as well as a variety of electives that may be selected on the basis of professional or academic interests. Concentration areas include the following:

Public Organization and Management

The public organization and management concentration area is designed for students who plan to pursue careers as practical public administrators and who want to develop a special proficiency in general managerial skills and techniques. Students are introduced to the theory and practice of management, including the areas of supervision; administration of staff activities and organization; and methods and tactics of management. The curriculum also offers the opportunity for the student to develop an understanding of the ethical, historical, political, and legal environment in which management skills have been developed and must be used.

Public Finance and Budgeting

Public finance and budgeting surveys the problems of government taxing, spending, and borrowing from a historical, political, economic, and behavioral perspective. A concentration in public finance and budgeting will offer students the opportunity to master the techniques necessary to plan and analyze public projects, formulate and execute public budgets, and audit and evaluate public programs and policies.

Public Personnel Administration

The course offerings in the public personnel administration concentration area introduce the student to the technical and skill-building aspects of public personnel administration, as well as to the theoretical issues involved in the field. This focus is well suited for those who want to make personnel adminis-

tration a career, as well as for those who seek some general background in this area of public administration.

State and Urban Government

The state and urban government concentration area has been developed with three major objectives. The first is to provide students with the opportunity to develop a rich background in the contemporary conditions, problems, challenges, and opportunities of urban government, state government, intergovernmental relations, and state and local finance and budgeting. Second, the program seeks to help make students aware of the political environment that surrounds state and urban administration. Finally, the state and urban government concentration tries to acquaint students with the techniques that are appropriate to state and urban administration.

Policy Sciences

This concentration is designed to provide students with the chance to develop the basic skills needed for policy analysis and program evaluation. It is also designed to promote the use of these skills as part of a public manager's decision-making process. Students will be offered the opportunity to learn how to apply relevant social science research methods to the analysis of public problems and how to assess the diverse consequences of governmental decisions in the broader political and economic environment.

Development Administration

The development administration concentration covers technical aspects of development administration in conjunction with area studies and provides for practical application of development administration techniques. An understanding of the political, cultural, and economic forces impinging upon the administrative programs of developing countries is also explored. This concentration will enhance the careers of students who plan to return to public service in their respective countries, as well as help students whose careers will involve work with development agencies of industrial nations or international organizations.

Off-Campus Facility

With the cooperation of the Federal Executive Board, the Department of Political Science offers its master of public administration program at the John F. Kennedy Building in downtown Boston. This program is primarily for individuals employed in federal, state, or local civil services and for those who plan on a career in the public sector. Courses are normally given in the evening.

Course Listings

The following is a listing of all departmental course offerings. Please refer to the *1984–1985 Graduate Schools Course Descriptions* for course descriptions and relevant prerequisites.

Course No.	Course Name	Credit
POL 3500	Scope and Methods of Political Science	3 QH
POL 3502	Seminar in American Government	3 QH
POL 3504	Political Psychology & Socialization	3 QH
POL 3506	Politics & Mass Media	3 QH
POL 3508	Legislative Process	3 QH
POL 3510	Theories of American Political Participation	3 QH
POL 3512	American Constitutional Law 1	3 QH
POL 3514	American Constitutional Law 2	3 QH
POL 3516	The Presidency	3 QH
POL 3518	American Electoral Behavior	3 QH
POL 3519	Campaigns and Elections	3 QH
POL 3520	The Judiciary	3 QH
POL 3522	Political Parties, Pressure Groups, and Public Policy	3 QH
POL 3524	Civil Rights	3 QH
POL 3526	Procedural Due Process	3 QH
POL 3531	Models of Political Systems	3 QH
POL 3533	Eurocommunism	3 QH
POL 3535	Parliamentary Democracy in Western Europe	3 QH
POL 3537	Comparative Communism	3 QH
POL 3539	European Political Parties	3 QH
POL 3541	European Legislative Systems	3 QH
POL 3543	European National Executives	3 QH
POL 3545	Government & Politics in the Middle East	3 QH
POL 3547	Government & Politics in North Africa & the Middle East	3 QH
POL 3550	Government & Politics of the United Kingdom & Northern Ireland	3 QH
POL 3551	Seminar in International Relations	3 QH
POL 3552	International Political Economy	3 QH
POL 3553	Government & Politics in Germany	3 QH
POL 3554	Government & Politics in France	3 QH
POL 3555	International Organization	3 QH
POL 3556	China in Revolution	3 QH
POL 3557	Soviet-Chinese Relations	3 QH
POL 3558	Asia & Politics of Development	3 QH
POL 3559	Government & Politics of Latin America	3 QH
POL 3560	Development Politics	3 QH
POL 3561	Great Powers & the Middle East	3 QH
POL 3562	U.S.–Soviet Relations	3 QH
POL 3563	U.S.–Far East Relations	3 QH
POL 3564	China's Foreign Policy	3 QH
POL 3565	Soviet Relations with Eastern Europe	3 QH
POL 3566	Chinese Politics	3 QH
POL 3567	Japanese Politics	3 QH
POL 3568	Subsaharan African Politics	3 QH
POL 3569	Decision Making in U.S. Foreign Policy	3 QH
POL 3570	American Foreign Policy	3 QH
POL 3572	Problems of World Order 1	3 QH
POL 3573	Problems of World Order 2	3 QH
POL 3575	Arab-Israeli Dispute	3 QH
POL 3578	Soviet Foreign Policy	3 QH
POL 3580	The United Nations	3 QH

Course No.	Course Name	Credit
POL 3581	International Peace Keeping	3 QH
POL 3583	International Law	3 QH
POL 3584	Regional Organization	3 QH
POL 3585	The Atlantic Community	3 QH
POL 3586	Nationalism	3 QH
POL 3587	Politics of Revolution & Change	3 QH
POL 3589	Terrorism, Violence & Politics	3 QH
POL 3590	Crisis Politics in Democracies and Dictatorships	3 QH
POL 3591	Totalitarianism	3 QH
POL 3593	Ancient & Medieval Political Thought	3 QH
POL 3594	Modern Political Thought	3 QH
POL 3595	Contemporary Political Theory	3 QH
POL 3596	Marxism	3 QH
POL 3597	Trends in American Political Thought	3 QH
POL 3600	Survey of Public Administration	3 QH
POL 3601	Public Personnel Administration	3 QH
POL 3602	Organizational Theory & Management	3 QH
POL 3603	Public Financing & Budgeting	3 QH
POL 3604	Techniques of Policy Analysis	3 QH
POL 3605	Quantitative Techniques for Public Administrators I	3 QH
POL 3606	Quantitative Techniques for Public Administrators II	3 QH
POL 3607	Quantitative Techniques III: Computer Applications	3 QH
POL 3610	Methods of Economic Analysis for Public Administrators	3 QH
POL 3611	Intergovernmental Relations	3 QH
POL 3613	Constitutional Law in Public Administration	3 QH
POL 3614	Administration Ethics in Public Management	3 QH
POL 3615	Development Administration	3 QH
POL 3616	State Government	3 QH
POL 3618	Problems in Urban Planning	3 QH
POL 3619	Techniques of Urban Planning	3 QH
POL 3620	Politics of State & Urban Planning	3 QH
POL 3621	Problems of Urban Development	3 QH
POL 3622	Urban Government	3 QH
POL 3623	Transportation Policy	3 QH
POL 3624	Problems of Community Development	3 QH
POL 3625	Collective Bargaining in the Public Sector	3 QH
POL 3626	Grantsmanship	3 QH
POL 3627	Management Information Systems	3 QH
POL 3629	Computers & Public Administration	3 QH
POL 3630	Health-Care Administration	3 QH
POL 3631	Housing & Community Development	3 QH
POL 3632	Public Fiscal Management	3 QH
POL 3634	Functions & Techniques of Public Management	3 QH
POL 3635	Environment & Energy Policy	3 QH
POL 3637	Comparative Public Administration	3 QH
POL 3639	Federal Administrative Law	3 QH
POL 3640	Governmental Accounting	3 QH
POL 3641	Techniques of Program Evaluation	3 QH
POL 3642	Management Planning and Decision Making	3 QH
POL 3643	Organizational Psychology & Behavior	3 QH
POL 3644	Public Policy Issues in Human Services	3 QH
POL 3645	Program Implementation	3 QH
POL 3646	Position Management	3 QH
POL 3647	Manpower Policy & Administration	3 QH
POL 3649	Regulatory Administration	3 QH
POL 3650	Group Dynamics	3 QH
POL 3652	Civil Liberties in Public Administration	3 QH
POL 3653	Survey Research for Public Administration	3 QH
POL 3654	Computer Software for Public Administrators	3 QH

Course No.	Course Name	Credit
POL 3655	Politics & Administration in Cities & Towns	3 QH
POL 3657	Organizational Analysis	3 QH
POL 3658	State & Local Finance & Budgeting	3 QH
POL 3659	Municipal Finance	3 QH
POL 3660	Development Planning	3 QH
POL 3661	Municipal Law	3 QH
POL 3662	Comparative Urban Government & Administration	3 QH
POL 3663	Techniques of Public Budgeting	3 QH
POL 3664	Politics & Issues in Public Budgeting	3 QH
POL 3665	Women in Public Management	3 QH
POL 3666	Housing Crisis	3 QH
POL 3667	Equal Opportunity in Public Administration	3 QH
POL 3668	Legal Issues in Public Personnel Administration	3 QH
POL 3669	Labor Relations in Public Administration	3 QH
POL 3670	Public Relations in Public Administration	3 QH
POL 3671	Social Welfare Policy & Administration	3 QH
POL 3673	Career Development	3 QH
POL 3674	Federal, State & Local Financing Relations	3 QH
POL 3675	Health Policy & Politics	3 QH
POL 3676	Practices in Self-Development in Public Management	3 QH
POL 3677	Elder Services Policy & Administration	3 QH
POL 3678	Federal Bureaucracy	3 QH
POL 3679	Seminar in Development Administration	3 QH
POL 3690	Topical Seminar	3 QH
POL 3695	Seminar in Public Organization & Management	3 QH
POL 3696	Seminar in Public Finance & Budgeting	3 QH
POL 3697	Seminar in Public Personnel Administration	3 QH
POL 3698	Seminar in Policy Sciences	3 QH
POL 3699	Seminar in State & Urban Administration	3 QH
POL 3890	Assigned Reading	1-6 QH
POL 3892	Internship Readings & Analysis	1-6 QH
POL 3895	Thesis	1-6 QH
POL 3798	Master's Thesis Continuation	0 QH

Psychology

The Department of Psychology has developed extensive programs of research and training in experimental psychology and in applied behavior analysis. The guiding principles are:

- Progress in the scientific analysis of behavior not only is important in its own right but also governs the application of psychology to such fields as education, habilitation, medicine, and social planning.
- Research into many of the facets of human and animal behavior requires a wide range of methods and knowledge; problems for investigation often fail to respect the boundaries between disciplines.
- The study of behavior with the methods of the natural sciences frequently demands sophisticated instrumentation for control of the environment and measurement of the behavior.
- Training in experimental psychology must be built around a series of apprenticeships in which the student collaborates with proved scholars and scientists.

In addition to developing students' research talents, the program fosters and provides opportunity for the acquisition of expertise in teaching behavioral science.

Chairperson

Martin Block, PhD, *University of Pittsburgh*

Professors

John C. Armington, PhD, *Brown University*

Francois Grosjean, PhD, *Doc es Lettres, University of Paris*

Harlan Lane, PhD, *Doc es Lettres, Harvard University*

Helen Mahut, PhD, *McGill University*

Joanne L. Miller, PhD, *University of Minnesota*

Bertram Scharf, PhD, *Harvard University*

Alexander A. Skavenski, PhD, *University of Maryland*

Harold S. Zamansky, PhD, *Harvard University*

Associate Professors

Edward A. Arees, PhD, *University of Massachusetts*

Roger F. Brightbill, PhD, *Harvard University*

Perrin S. Cohen, PhD, *Columbia University*
Stephen Harkins, PhD, *University of Missouri*
Charles Karis, PhD, *Boston University*
Harry A. Mackay, PhD, *Queen's University*

Adjunct Professor

Margaret Bauman, MD, *Medical College of Pennsylvania*

Assistant Professors

John J. Carroll, PhD, *Cornell University*
Adam Reeves, PhD, *City University of New York*
Judy A. Shepard-Kegl, PhD, *Massachusetts Institute of Technology*

Senior Scientist of Psychology

Murray Sidman, PhD, *Columbia University*

Clinical Associate Professor

Karen Gould, PhD, *University of Kansas*

Adjunct Associate Professors

Beatrice H. Barrett, PhD, *Purdue University*
Robert Bass, PhD, *Brown University*
Lawrence T. Stoddard, PhD, *Columbia University*

Adjunct Assistant Professors

Renée Briggs, PhD, *Boston University*
Charles Hamad, PhD, *University of Kansas*
William L. Holcomb, MA, *Northeastern University*
Matthew L. Israel, PhD, *Harvard University*
Myrna Libby, PhD, *Brown University*

Research

Research conducted by members of the Psychology Department falls into five general areas: language (including American Sign Language) and cognition; learning, motivation, and behavior analysis; neuropsychology and biological psychology; experimental personality and social psychology; and sensation and perception. Each of these is evident among the research vignettes provided on pages 137–138. However, the list is arranged in the alphabetical order of faculty surnames to allow easy identification of a sample of the research performed by a particular faculty member. This reflects the importance to the program of the mutuality of interests that underlies the apprentice relationship between student and adviser. In addition, particular research projects often are not easily classified in broad traditional terms; their specific foci shift as they progress, and collaborations evolve. The reader should consult the brochure

Research in Psychology at Northeastern for more extensive descriptions of ongoing research.

DR. AREES—analysis of elementary responses of insects and other small organisms in relationship to structural aspects of their nervous systems. Using video recordings, the frequency and pattern of specific behaviors are analyzed and compared across different species.

DR. ARMINGTON—the relationship of psychophysics to the electrophysiology of vision. Visual-evoked potentials, electroretinograms, and eye movements are recorded in studies of pattern vision, resolution, light adaptation, and color vision.

DRS. BASS and GOULD—applied behavior analysis and mental retardation. Stimulus control techniques are applied to conceptual learning tasks and to the solution of behavior-management problems.

DR. BLOCK—biological bases of animal social behavior and communication. One ongoing experiment seeks to identify olfactory cues, and genetic and motivational factors influencing parent-infant and peer interactions of gerbils and voles.

DR. CARROLL—the interaction of linguistic and real-world knowledge in the comprehension of discourse. Current work includes analysis of factors underlying the detection and interpretation of nonliteral speech such as sarcasm and irony.

DR. COHEN—analysis of reinforcer-induced, motivated behaviors that have been described as addictive, interim, adjunctive, or schedule-induced. Current research explores the possibility that such behaviors reflect either of two types of reinforcer-induced motivational states.

DR. GROSJEAN—the psycholinguistics of monolinguals and bilinguals. Current research includes analysis of syntactic, prosodic, and lexical units in language processing.

DR. HARKINS—analysis of the social impact that the presence of others has on an individual. He is currently examining the effects of social context on persuasion.

DR. LANE—the structure, history, and use of American Sign Language to shed light on universal properties of language. One set of experiments examines how articulatory and perceptual constraints influence manual language.

DR. MACKAY—serial learning and memory and the prerequisites of conceptual learning in the retarded. In one set of studies, for

example, he uses a sequence-reproduction procedure that is analogous to the digit span test to assess effects of temporal and other variables on remembering in the retarded.

DR. MAHUT—brain mechanisms that mediate memory, with special emphasis on diencephalic and temporal lobe structures. Parallel investigations focus on immediate and long-term effects of ablations of equivalent structures in infant monkeys.

DR. MILLER—research on language production and comprehension aims, for example, to specify how the speech signal changes with the rate of speech and stress pattern, as well as how listeners accommodate to these changes.

DR. REEVES—human visual perception and visual information processing. Current research concerns effects of attention and imagery on visual perception, color vision, adaptation, and visual masking.

DR. SCHARF—research in the Auditory Perception Laboratory is concerned with loudness, adaptation, masking, discrimination, and speech perception in normal and hearing-impaired persons. Experiments on auditory selective attention—the ability to listen to some sounds and ignore others—is also under study.

DR. SHEPARD-KEGL—linguistic analyses of various levels of organization in language, especially phonology and the linguistics of ASL. Ongoing work includes study of the role of locative and directional notions in language.

DR. SKAVENSKI—neural mechanisms that use information about the orientation of the eyes in the head for visual localization and the control of eye movement. Current studies aim to describe the consequences of posterior parietal cortex lesions on eye-movement control and visual localization to see if this region is crucial to normal behavior.

DR. STODDARD—experimental analysis of behavior occurring in an automated teaching environment for communicating with severely retarded and autistic individuals and for remediating their behavioral deficiencies. Other research involves analysis of relational discriminations in elementary forms of logical thinking, a step in explaining the emergence of novel behavior without direct conditioning.

DR. ZAMANSKY—studies of hypnosis and related phenomena. Experiments in progress deal with cognitive and motivational characteristics of hypnotizable and nonhypnotizable subjects and with the structure of suggestibility.

PhD Program

The Department of Psychology offers a full-time program of graduate studies and research in experimental psychology leading to the PhD degree. Applicants are considered only for the doctoral program—the MA is granted in the course of progress toward the PhD. Since the PhD degree is awarded in experimental psychology, accomplishment in research forms an essential and integral part of the program. Students may expect to collaborate with faculty in conducting research in one or more of the following broad areas: learning, motivation, and behavior analysis; sensation and perception; neuropsychology and psychobiology; language and cognition; and experimental personality and social psychology.

Desirable experience includes laboratory courses in psychology and allied natural sciences, as well as courses in mathematics. Applications should be filed in the department by February 15, complete with official transcripts, three letters of recommendation, and a personal essay. Scores on the Graduate Record Examination and the Miller Analogies Test should be sent to the Graduate School of Arts and Sciences office.

Research assistantships and teaching assistantships offer students the opportunity to receive a tuition scholarship. In addition, those positions also carry a stipend in return for work performed in the department. The Psychology Department endeavors to support, when possible, all graduate students requesting financial aid.

The first year of the program is uniform for all students. It includes four proseminars in advanced experimental psychology (language and cognition, neuropsychology, learning and motivation, and sensation and perception) and two courses in quantitative methods. In addition, all students are expected to choose a research adviser and take an active part in one of the current research projects. Detailed descriptions of the current research projects are contained in the brochure *Research in Psychology at Northeastern*, available on request.

At the end of the second academic year, each student's readiness for the doctoral program is determined on the basis of performance in the four proseminars and written examinations in the quantitative methods courses. Equal emphasis is placed on the quality of research.

After the first year, the structure of the doctoral program is flexible and assumes that the process of learning and scientific discovery must be individualized; however, the minimum requirements of the Graduate School of Arts and Sciences for the master's degree and the doctor of philosophy degree as estab-

lished on pages 30 and 32 apply. A wide variety of advanced seminars and courses are offered. Colloquia and in-house seminars bring students and faculty together to discuss ongoing research, often with visiting scholars from other institutions. Most important, students pursue their research projects under the guidance of their advisers. The advisers and projects available to students vary from year to year. Potential applicants are encouraged to visit the department in order to discuss their interests with the faculty and to observe the program and facilities firsthand.

MA in Applied Behavior Analysis

The Department of Psychology also offers a full-time graduate program leading to a terminal MA degree in applied behavior analysis. The program is jointly sponsored by Northeastern University and by the University-affiliated facility of the Eunice Kennedy Shriver Center for Research in Mental Retardation located at the Walter E. Fernald State School for the Retarded.

The two-year program provides the opportunity for students to prepare primarily for service-oriented clinical employment at professional and supervisory levels, in positions that relate to remedial treatment and programming for the retarded. Experience in clinical settings and in applied and laboratory research, along with the broad academic curriculum, also provides students with the opportunity to prepare for further graduate studies in human behavior and learning.

Desirable background includes academic and laboratory courses on human and animal learning, preferably with an operant-conditioning perspective, and some experience with retarded individuals. Applications should be filed by March 1, complete with transcripts, three letters of recommendation, a personal essay, and scores on the Graduate Record Examination.

Support for MA students can include full tuition remission in return for performing teaching assistant functions for the department. Also, field placements, when available, allow paid employment for a maximum of twenty hours per week.

The program is conducted primarily at the Shriver Center and associated facilities. The minimum requirements of the Graduate School of Arts and Sciences for the master's degree as established on page 30 apply. The curriculum stresses the analysis of stimulus control and programmed teaching as solutions to the problems in learning and behavior management encour-

tered by the retarded. In addition, courses encompass the broader interdisciplinary aspects of mental retardation, covering such topics as its biological bases, neurological and sensory impairments, multidisciplinary evaluation and treatment, and administration of services. Experimental design and research seminars help prepare students to conduct a number of applied projects and their master's thesis research.

Supervised clinical experience is provided with different retarded populations and age groups, including those with motor and sensory handicaps, in a variety of settings. Most students are placed in positions where they receive supervisory and administrative training. Additional experiences include interdisciplinary team evaluations using behavioral and traditional assessment methods; staff training in behavior management and training techniques; community experience via outpatient and home-treatment services, consultants to schools and clinics, and parent training; and laboratory research participation.

Most of the faculty have joint appointments in the Psychology Department of Northeastern University and in the Behavioral Sciences Department of the Shriver Center. The faculty and advisers are drawn primarily from the departmental areas of learning and personality (Bauman, Gould, Mackay, Sidman, Stoddard, and Zamansky) and from the staff of the Shriver Center. The MA students maintain an active involvement with the University and the parent Psychology Department through their teaching assistant functions, a number of required and elective courses, colloquia, in-house seminars, and informal exchanges with faculty and students.

Potential applicants may write for further information to the department; they are also encouraged to visit the Shriver Center and the department to discuss the program and their interests with the faculty and to see the facilities firsthand.

Course Listings

The following is a listing of all departmental course offerings. Please refer to the *1984–1985 Graduate Schools Course Descriptions* for course descriptions and relevant prerequisites.

Course No.	Course Name	Credit
PSY 3111	Quantitative Methods I	3 QH
PSY 3113	Proseminar	4 QH
PSY 3115	Proseminar	4 QH
PSY 3116	Proseminar	4 QH
PSY 3118	Proseminar	4 QH
PSY 3119	Attention I	3 QH

Course No.	Course Name	Credit
PSY 3121	Experimental Design in Applied Research	3 QH
PSY 3122	Applied Programming Seminar I	3 QH
PSY 3123	Programmed Learning	3 QH
PSY 3126	Child Language Development	3 QH
PSY 3127	Neurological and Sensory Impairments Seminar I	3 QH
PSY 3128	Neurological and Sensory Impairments Seminar II	3 QH
PSY 3129	Mental Retardation Seminar	3 QH
PSY 3132	Behavior Intervention I	3 QH
PSY 3133	Advanced Learning Seminar I	3 QH
PSY 3143	Learning Principles and Applications I	4 QH
PSY 3145	Human Neuropsychology I	4 QH
PSY 3151	Brain and Behavior I	3 QH
PSY 3155	Sensory Psychophysiology I	4 QH
PSY 3159	Neurochemistry and Behavior	3 QH
PSY 3161	Cognition and Psycholinguistics I	3 QH
PSY 3166	Psycholinguistics	3 QH
PSY 3169	Seminar in the Structure of American Sign Language	3 QH
PSY 3171	Psychopathology I	4 QH
PSY 3185	Electrophysiological Recording	3 QH
PSY 3188	Vision I	3 QH
PSY 3189	Psychoacoustics	3 QH
PSY 3211	Quantitative Methods II	3 QH
PSY 3219	Attention II	3 QH
PSY 3222	Applied Programming Seminar II	3 QH
PSY 3225	Biological Basis of Mental Retardation	3 QH
PSY 3229	Administration of Mental Retardation Services	3 QH
PSY 3232	Behavior Intervention II	3 QH
PSY 3233	Advanced Learning Seminar II	3 QH
PSY 3243	Learning Principles and Application II	4 QH
PSY 3245	Human Neuropsychology II	4 QH
PSY 3251	Brain and Behavior II	3 QH
PSY 3255	Sensory Psychophysiology II	3 QH
PSY 3261	Cognition and Psycholinguistics II	3 QH
PSY 3264	Language Acquisition	3 QH
PSY 3269	Linguistic Theory and American Sign Language	3 QH
PSY 3271	Psychopathology II	4 QH
PSY 3288	Vision II	3 QH
PSY 3289	Perception	3 QH
PSY 3291	Research Laboratory	1 QH
PSY 3311	Quantitative Methods III	3 QH
PSY 3319	Attention III	3 QH
PSY 3321	Systematic Inquiry in Applied Research I	3 QH
PSY 3322	Applied Programming Seminar III	3 QH
PSY 3324	Behavior Change in Institutions	3 QH
PSY 3333	Advanced Learning Seminar III	3 QH
PSY 3355	Physiological and Comparative Psychology I	3 QH
PSY 3371	Social Psychology	3 QH
PSY 3388	Vision III	3 QH
PSY 3418	Modern Psychophysics	3 QH
PSY 3419	Special Topics in Psychology	*
PSY 3421	Systematic Inquiry in Applied Research II	3 QH
PSY 3422	Applied Programming Seminar IV	3 QH
PSY 3455	Physiological and Comparative Psychology II	3 QH
PSY 3477	Personality Theory and Research I	3 QH
PSY 3521	MABA Research	3 QH
PSY 3522	Applied Programming Seminar V	3 QH
PSY 3549	Practicum	3 QH
PSY 3555	Physiological and Comparative Psychology III	3 QH

*Maximum of nine quarter hours credit.

Course No.	Course Name	Credit
PSY 3577	Personality Theory and Research II	3 QH
PSY 3649	Community Treatment	3 QH
PSY 3891	Thesis	6 QH
PSY 3894	Dissertation	0 QH
PSY 3798	Master's Thesis Continuation	0 QH
PSY 3799	Doctoral Dissertation Continuation	0 QH

Sociology and Anthropology

The Department of Sociology and Anthropology offers a flexible program, combining sociology and anthropology and providing students an opportunity to acquire broad competence in these fields as well as in related specialized areas. Given the diverse needs of its undergraduate teaching program, the department accommodates a faculty with a wide range of substantive interests covering more than twenty-five of the areas of concentration listed in the American Sociological Association's *Guide to Graduate Departments of Sociology*. The department's offerings in anthropology are considerably more limited, concentrated mostly in social anthropology. The department has particular strengths in the following broadly defined areas:

- Cultural processes, social psychology, and social theory
- Political sociology, economic development, and social change
- Deviance, law, and social control
- Family, sex roles, and aging
- Work, occupations, professions, and organizations
- Race, ethnicity, and community studies
- Technology, population, resources, and environment

The department has no predominant paradigmatic orientation. There are on the faculty individuals who do fieldwork, as well as those who do large-scale quantitative surveys, social psychological experiments, content analysis, and comparative historical analysis. Likewise, many theoretical perspectives are represented, including critical theory, symbolic interaction, role theory, network theory, structural functionalism, structural Marxism, and world systems theory.

Professors

Morris Freilich, PhD, *Columbia University*

Elliott A. Krause, PhD, *Boston University*

Jack Levin, PhD, *Boston University*

Morton Rubin, PhD, *University of North Carolina*

Earl Rubington, PhD, *Yale University*

Associate Professors

Carol A. Owen, PhD, *Cornell University, Chairperson*
Arnold Arluke, PhD, *New York University*
Richard Bourne, PhD, *Harvard University, JD, Boston University*
M. Patricia Golden, PhD, *Cornell University*
Wilfred E. Holton, PhD, *Boston University*
Debra R. Kaufman, PhD, *Cornell University*
Thomas H. Koenig, PhD, *University of California, Santa Barbara*
Ronald J. McAllister, PhD, *Duke University, Graduate Coordinator*

Assistant Professors

Winifred Breines, PhD, *Brandeis University*
Paul G. Creelan, PhD, *University of Chicago (on leave 1984–85)*
Herman S. Gray, PhD, *University of California, Santa Cruz*
Eva Havas, PhD, *Boston University*
Maureen Kelleher, PhD, *University of Missouri, Columbia*
Alan M. Klein, PhD, *State University of New York, Buffalo*
Bruce K. MacMurray, PhD, *University of Iowa*
Judith Perrolle, PhD, *Brown University*
Michael Rustad, PhD, *Boston College (on leave 1984–85)*
Thomas M. Shapiro, PhD, *Washington University*
Carmen J. Sirianni, PhD, *State University of New York, Binghamton*

Research

Teaching responsibilities for a diverse undergraduate student clientele are reflected in and complemented by a remarkable level of scholarly productivity and policy involvement in a wide range of areas. In the past year, faculty members have given more than fifty papers at professional meetings and have produced more than thirty articles and chapters in books, on topics ranging from aging and athleticism to women's studies and work. In addition to recently published books on community and organization in the new left (Breines), the pleasures of anthropology (Freilich), women and achievement (Kaufman), drugs and society (Kelleher, MacMurray, and Shapiro), women in the military (Rustad), and the experience of labor in Europe and America, 1900–1925 (Sirianni), several other manuscripts are in press—on community-controlled adolescents (Kelleher), mass murder (Levin), and the politics of sterilization (Shapiro). Still other books are under contract and in preparation on topics including the politics of specialization in the field of rehabilitation (Arluke), gender in the social science of the 1950s (Breines), family violence (Bourne), the subculture of body building (Klein), class struggle in the legal profession (Koenig and Rustad), the death of the professions (Krause), computers

and society (Perrolle), and equality and democracy in the division of labor (Sirianni). Faculty are also involved in research and writing on ageism (Arluke and Levin), the religious significance of behaviorism (Creelan), police discretion (Freilich), the patron system in academia (Golden), single-parent families (Havas), women returning to orthodox Judaism (Kaufman), political action committees (Koenig), punk counterculture (Levin), social futurism (MacMurray), theology lessons for sociology (McAllister), women in science and mathematics in the United States and Japan (Owen and Golden), reproductive hazards in the work place (Perrolle, Koenig, and Rustad), environmental and equity issues in Boston (Rubin), alcoholism (Rubington), and democratization and self-management in the twentieth century (Sirianni).

Programs of Study

The Department of Sociology and Anthropology offers several degree programs: the master of arts in social anthropology, the master of arts in sociology, and the doctor of philosophy in sociology. The department also participates in the interdisciplinary doctoral program in law, policy, and society (see page 94).

Admission

The general procedures and requirements for admission to the Graduate School of Arts and Sciences are set forth on page 20. For admission to the Department of Sociology and Anthropology, all applicants must submit to the department an application form, a one- or two-page personal statement, complete official transcripts for all undergraduate and graduate studies undertaken, and three letters of recommendation (at least two of which must be academic references). Aptitude test scores (verbal, quantitative, and analytical) on the Graduate Record Examination (GRE) are also required. (In special cases, Miller Analogies Test scores may be accepted in lieu of GRE scores. Please consult the chairperson of the Committee on Graduate Studies.) Test scores should be submitted to the office of the Graduate School of Arts and Sciences. In order to advance to degree candidacy, applicants for the PhD program (see under PhD Degree, Admission) must also submit with their application written materials that demonstrate their capacity for scholarship at the doctoral level. (Copies of several course or term papers or a copy of a master's thesis or paper would be appropriate.) International students should also check page 25 of this catalog.

Applications for admission are considered on a continuing basis for entry in any term specified by the applicant, provided

the application is received at least two months prior to the beginning of the term in which the student wishes to matriculate. Students should be aware, however, that the sequencing of required courses is predicated on fall entry.

Each application is reviewed on its own merits. Any questions concerning the adequacy of the applicant's undergraduate or graduate background in sociology or anthropology are considered individually. In some cases, students may be asked to make up certain deficiencies before proceeding to the basic MA or PhD requirements. Exceptions are made with respect to procedural or substantive requirements on an individual basis if the circumstances seem sufficiently compelling.

In order to ascertain whether their interests coincide with those of the faculty, prospective candidates are urged to learn something about the scholarly interests and writings of the department's faculty and to talk with graduate students currently in residence, in addition to examining the catalog and course offerings.

Financial Aid

There are several types of financial assistance available for graduate students in the department and in the University (see page 16). The three types of assistance described below are awarded by the department. Students must apply for these awards as part of the regular application process. No separate application is required. While there can be no guarantee of financial aid, students should be aware that in recent years, the department has been able to provide either full or partial funding for most students with strong records.

Teaching Assistantships

Most of the department's teaching assistantships are awarded for thirty-nine weeks, although, dependent on undergraduate student enrollments, additional awards sometimes become available on a thirteen-week appointment basis. Teaching assistants are expected to work fifteen to twenty hours per week assisting faculty in teaching undergraduates (conducting discussion sections, grading, etc.). Assistantships provide a tuition scholarship and an additional stipend. They are generally given to continuing students, going to new students only if they have had sufficient experience in teaching undergraduates or if all other promising continuing students have been supported. During the summer quarter, only a limited number of teaching assistantships are available. Students should note, however, that thirty-nine-week awards provide tuition scholarships for the calendar year (see page 20).

Research Assistantships

When departmental funds permit or when funds from outside sources become available, research assistantships may be awarded. Such awards are limited in number, usually to two or three per year. When available, they provide students the opportunity to receive a tuition scholarship. In return for an additional stipend earned with the award, students are expected to work fifteen to twenty hours per week assisting faculty in research activities. In general, research assistantships, too, are more likely to go to continuing students. Awards made for thirty-nine weeks provide tuition remission for the calendar year (see page 20).

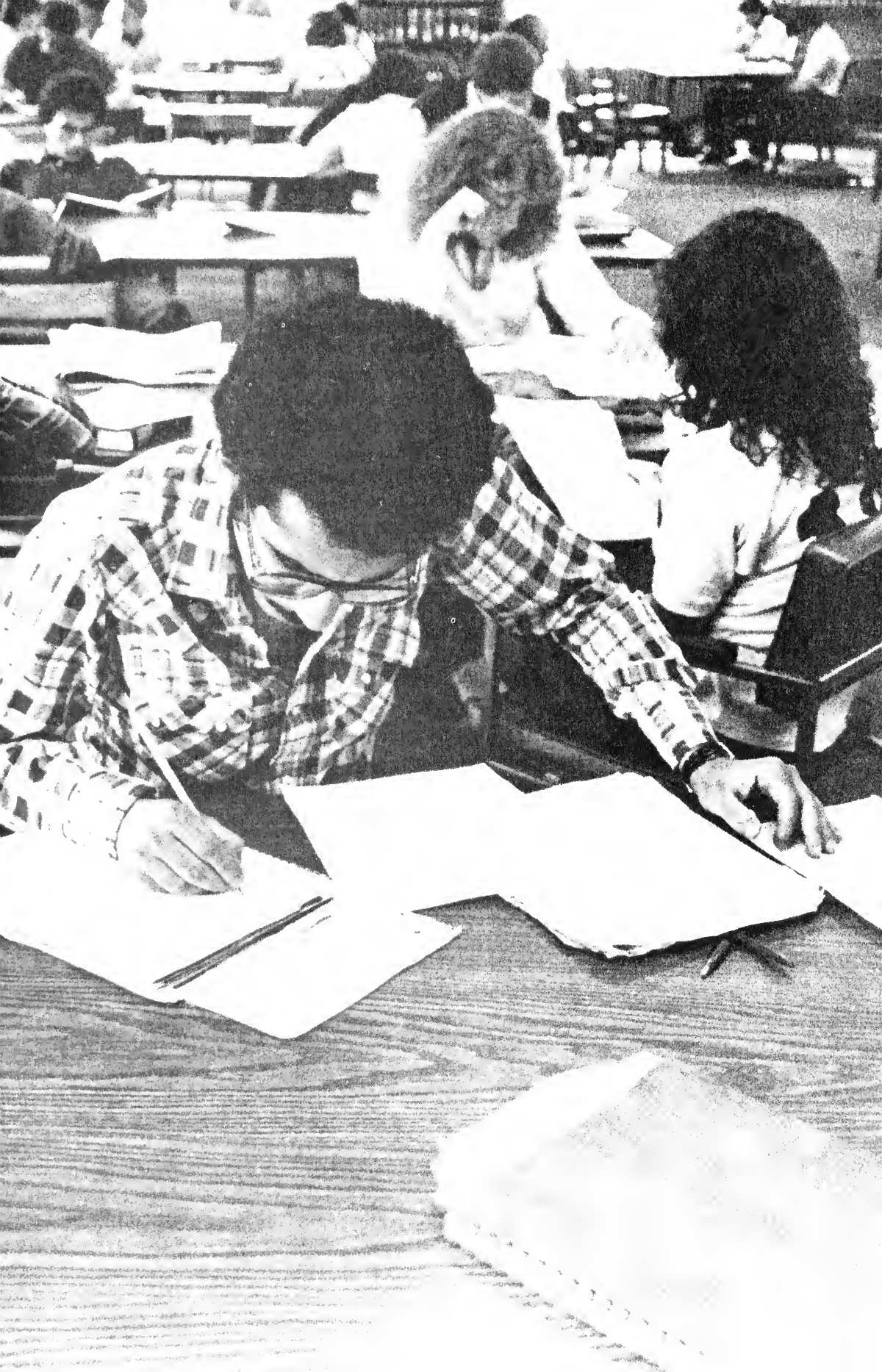
Tuition Assistantships

These awards grant tuition remission only, in return for which a student will be called upon for service (e.g., grading, proctoring, bibliographical work, or other small research tasks) of up to eight hours per week. New students are more likely to be offered tuition assistantships. Students should note that the tuition received via this type of assistantship is classified as taxable income by the Internal Revenue Service.

Although the department accepts applications for admission on a continuing basis, the application deadline for financial assistance in the following academic year is May 15. Applications received before March 15 are given priority. Decisions on financial assistance are made in the spring quarter, separate from decisions on admission. Thus, a student might hear about the admissions decision some time before hearing about the assistance decision.

As a general departmental policy, students in the MA program are limited to four quarters of full-time funding, or the equivalent. Those students who enter the PhD program with an MA or its equivalent are limited to six quarters of full-time funding, or the equivalent, by the department. (This limitation does not affect or apply to funding from other sources in the University, such as the Office of Financial Aid.) Those who enter the doctoral program directly from undergraduate school may be funded by the department for up to ten quarters. (Again, this limitation does not affect or apply to funding from other sources in the University or elsewhere.) Reappointment is contingent upon satisfactory performance in academic work and assigned duties.

Students should note the acceptance conditions and terms of appointment outlined on page 21. Students who hold assistantships are expected to devote full time to their studies and the duties of the award.



N.B.: Some of the requirements listed here for both the MA and PhD have undoubtedly been modified. Please check with the department and/or the Graduate School for the most recent information. This applies also to course offerings.

The Master's Degree

The department offers graduate programs leading to a master of arts degree in sociology or in social anthropology. Forty quarter hours of academic work, completed with a B (3.0) average or better, is required for the degree. The program usually consists of five or six required and six or seven elective courses. With the approval of the department and the Graduate School, certain advanced undergraduate courses offered by the department may be taken for graduate credit. In these courses, students must maintain better than a B (3.0) average.

Students are encouraged to fashion a program of studies best suited to their needs and abilities. To this end, all entering students should consult with the faculty adviser assigned to them. The faculty adviser not only helps the student to articulate interests and plan courses but also suggests other faculty members whose areas of interest and competence intersect with those of the student and with whom the student might consult on a regular basis. A permanent relationship with the first adviser continues only if there exists a mutual interest in such a partnership. Students may terminate or initiate an adviser/advisee relationship at any time, simply by consulting with and informing the parties concerned. The graduate secretary should also be informed of any changes.

For the master of arts in sociology, students are generally required to take two one-quarter courses in theory (usually SOC 3100 and SOC 3101) and two or three courses in methodology (usually SOC 3116 and either SOC 3117 or SOC 3120/SOC 3121, or SOA 3121/SOA 3122). The statistics requirement may be satisfied by achieving at least a B in SOC 3115 or its equivalent. All students are strongly advised to take some coursework in social anthropology. Each of the required courses carries four quarter hours of credit. Enrollment in the master's level pro-seminar (SOC 3125, SOC 3126, SOC 3127) is also suggested.

For the master of arts in social anthropology, students are generally required to take two one-quarter courses in theory (usually SOC 3100 and SOA 3100) and in methodology (usually SOA 3121 or SOC 3120 and SOA 3122 or SOC 3121), in addition to a basic course in anthropology (usually SOA 3101, SOA

3102, or SOA 3156). Other requirements are individually determined. All students are strongly advised to take some coursework in sociology. Each of the required courses carries four quarter hours of credit. Enrollment in the master's level pro-seminar (SOC 3125, SOC 3126, SOC 3127) is also suggested.

Students who can demonstrate proficiency in any of the requirements need not take those particular courses and should petition the Committee on Graduate Studies for an opportunity to demonstrate proficiency.

With the approval of at least one faculty supervisor, a student may elect to prepare a master's paper or to revise a paper prepared for a previous course as a master's paper. The paper earns six quarter hours of credit. Students should register *once* for SOA 3810, Master's Paper in Social Anthropology, or SOC 3810, Master's Paper in Sociology, and then for SOA 3798 or SOC 3798, Master's Thesis Continuation, during each subsequent quarter that they are working on their MA paper. The continuation registrations are fee-bearing (see page 31) but not credit-bearing. It is expected that the full-time student will complete the master's paper no later than the end of the second year of study.

A student choosing this option must have substantially completed the master's paper, as certified by the faculty supervisor, on or before April 1 of the year in which the student expects to be awarded the degree. Final approval by the supervisor must be secured at least two weeks before the commencement at which the degree is to be awarded. Those who miss the April 1 deadline normally have to wait until the next academic year to receive the degree. A September degree can be arranged only if the faculty supervisor (as well as any other members, should there be a committee) is available and agrees to read the student's paper during the summer term.

The Doctor of Philosophy Degree

The department offers the PhD in sociology. Only a limited number of students are enrolled in the PhD program, so as to provide highly personalized study and research training with individual supervision.

Admission

Applicants to the doctoral program should apply for admission in the year in which they expect to complete the requirements for the master's degree. Students who possess master's degrees earned in areas other than sociology are considered for admis-

sion on an individual basis. Please note that in addition to the usual materials required for admission to the department, all applicants for the doctoral program are required to submit with their application written materials that demonstrate their capacity for scholarship at the doctoral level. (Copies of several course or term papers or a copy of a master's thesis or paper would be appropriate.) See Admission Section on page 146, as well as sections on Qualifying Examination and Degree Candidacy below.

Residence Requirement

The University's residence requirement can be satisfied by one year of full-time graduate work, or its equivalent, beyond the master of arts degree. If the student's MA degree is not in sociology, a longer period of residence is normally required. Most students should expect to spend approximately two years, or the equivalent, in full-time graduate study beyond the requirements of the master's degree.

Qualifying Examination

Students must submit written materials in the social sciences for evaluation in accordance with rules established by the Committee on Graduate Studies (COGS). These materials (copies of several course/term papers or a copy of a master's thesis/paper would be appropriate) must demonstrate the student's capacity for scholarship at the doctoral level.

All students are expected to present and discuss their work in an oral examination under guidelines established by COGS. Strengths and weaknesses evident in the written materials are discussed with the student and suggestions made for remedying any weaknesses. Students should recognize that, while diagnosis is a goal of the qualifying examination, a critical evaluation is also made. A pass/conditional or pass/no pass decision is rendered by COGS and communicated to the student in writing. Those students who receive a conditional pass must address the concerns of COGS within two months, at which time a final evaluation of pass/no pass is made and communicated to the student in writing. In light of the examination performance, the student's future course is charted with the objective of helping the department and the student to determine the best course of action. Excessive weakness would lead to a recommendation that the student consider pursuing alternatives elsewhere.

Students applying for doctoral studies from outside the department should submit their qualifying documents with their application. An oral examination is then scheduled during the first quarter of doctoral residence. Applicants without appropriate written materials in the social sciences should consult the chair of COGS. Alternative ways of completing this require-

ment will be considered only in exceptional circumstances and only for students with masters degrees from other universities.

The qualifying materials must be submitted and accepted before the end of the first year of doctoral residence. (Please note that for continuing students, funding beyond the MA level may be contingent on completion of this requirement before the end of the first *quarter* of doctoral residence.) Students may make only two attempts to complete this requirement. This means that students have two opportunities (not counting resubmissions of conditional passes) to submit and defend acceptable qualifying documents. Should students not take and pass the examination (or should conditional passes not be resubmitted) within the time specified, or should the second attempt not prove successful, the student will be asked to leave the program.

Degree Candidacy

Degree candidacy is established in accordance with the general regulations of the Graduate School; that is, the student must have completed forty quarter hours of acceptable graduate work (the minimum course requirement of forty quarter hours constitutes the same work normally required for a master's degree) and must have passed the qualifying examination. To enter into degree candidacy in sociology, the student must also have a master of arts degree or its equivalent, three current letters of recommendation (at least two of which must be academic references) on file in the department, and an advisory committee consisting of three faculty members from the department.

Course Requirements

As prerequisites, all doctoral candidates are expected to have completed the core requirements for the master of arts in sociology (SOC 3100, SOC 3101, SOC 3115, SOC 3116, and SOC 3117—see page 140) or their equivalent. Students entering from another university or from another major may be required to take certain basic courses (e.g., the core requirements) before proceeding with the doctoral program. Credits earned for master's-level core requirements cannot be counted toward the doctorate.

Generally, thirty-three quarter hours of graduate work beyond the master's degree is required. Depending on background, experience, and performance, a greater or lesser number of formal courses may be required. Decisions on special cases are made by COGS, acting in conjunction with the student, the student's adviser(s), and the chairperson of the department.

All doctoral students are required to include in their program of study the Doctoral Proseminar (SOC 3620, SOC 3621, and

SOC 3622). Also required (with a minimum grade of B) are Recent Developments in Sociological Theory (SOC 3301) and Current Issues in Social Research (SOC 3321). All doctoral candidates are strongly urged to take additional research courses, especially Multiple Regression (SOC 3320) and, if they have not taken it previously, the Qualitative Methods sequence (SOC 3120/SOC 3121 or SOA 3121/SOA 3122).

Students who can demonstrate proficiency in any of the requirements need not take those particular courses and should petition COGS for an opportunity to demonstrate proficiency.

Students should register for SOC 3820, Doctoral Dissertation for three terms and then for SOC 3799, Doctoral Dissertation Continuation, during each subsequent quarter that they are working on their dissertation. These registrations are fee-bearing (see page 31) but not credit-bearing.

**Language
Requirement**

The language requirement may be satisfied by a reading knowledge of one language other than English in which there is substantial sociological literature or by a language needed for research in the student's area of specialization. Students must submit their choice of language to COGS for approval. The committee arranges for a means of demonstrating language competency. A research language may be a computer language or the native language of a foreign student, if these languages can be shown to be relevant to the student's dissertation research interests. The language requirement should be satisfied before students attempt to fulfill the comprehensive requirement (see below).

**Teaching
Requirement**

All doctoral candidates are required to teach. Students should register for SOC 3615, Tutorial in Teaching (for which a maximum of three quarter hours of credit may be counted toward the degree) during a term in which they are responsible for teaching a course. The COGS approves the tutorial credit, taking into consideration materials and evaluations supplied by the student.

Research Experience

All doctoral candidates are encouraged to acquire practical experience in social science research. This requirement may be met through working as a research assistant, through a directed study, or through some other arrangement acceptable to the candidate and COGS.

**Comprehensive
Requirement**

During the period of doctoral degree candidacy, each student must complete the comprehensive requirement, the purpose of which is to ensure that the student has mastery in two substantive areas of sociology. To demonstrate mastery, the student

must prepare two area portfolios, each area portfolio to be assembled under the supervision of a review committee consisting of three faculty members designated by the student and approved by COGS. The area portfolio, which would consist of any combination of written work (papers, examinations, or other assignments) deemed to be acceptable by the review committee, must include an annotated bibliography and a discussion of general issues in the area. A formal written examination might reasonably constitute one element of the portfolio, but such an examination would not be included unless the student petitioned for its inclusion and the review committee concurred. All students are expected to present their work in an oral defense of one hour for each portfolio, or two hours if the portfolios are presented jointly.

The portfolio is initially evaluated by the review committee on a pass/conditional pass/no pass basis. Portfolios given a conditional pass must be rewritten or redone within two months to address the review committee's concerns and must be resubmitted for a final evaluation of pass/no pass.

Students may make only two attempts to complete a particular portfolio. In other words, students have two opportunities (not counting resubmissions) to prepare an acceptable portfolio in each of their substantive areas. Should either of the portfolios not be accepted after a second submission (except under extraordinary circumstances), the student will be asked to leave the program. Likewise, should both of the portfolios receive a no pass evaluation on first submission, the student's candidacy will be terminated.

The comprehensive requirement must be completed at least nine months before the commencement at which the PhD is to be awarded. Until September 1985, students who entered the department before September 1983 may complete the comprehensive requirement in accordance with the guidelines outlined in either the 1980–82, 1982–84, or 1984–85 *Graduate School of Arts and Sciences Catalog*. Students who entered the department between September 1983 and September 1984 are required to adhere to the guidelines outlined in the 1982–84 or 1984–85 catalog. From September 1985, all students must adhere to the guidelines in the 1984–85, or succeeding, catalog.

Dissertation Proposal Hearing

The student must submit a prospectus describing the topic of the doctoral dissertation, the methods of research, and the theoretical relevance of the problem. This prospectus is to be discussed with, and approved by, the dissertation committee consisting of the student's major adviser, two readers within the department, and at least one reader from outside the department. A formal hearing is scheduled, at which the student

assembles the committee and other interested faculty and students to discuss the proposed work critically. If refinement of the proposal is considered necessary, the student is required to modify the document to satisfy the committee. The revised prospectus is then filed with the department. There is no alternative to the proposal hearing.

**Deadlines for
Considering a
Doctoral Dissertation**

The chairperson of the dissertation committee should be fully satisfied that a dissertation is substantially complete on or before April 1 of the year in which the candidate expects to defend the dissertation. A defense that might enable the student to receive a September degree can be arranged only if all members of the student's committee are available and agree to arrange a defense during the summer term.

**Final Oral
Examination**

The dissertation may be defended only after completion of all other requirements for the doctoral degree. This oral defense is held approximately four weeks after the dissertation has been accepted by the dissertation committee, and at least two weeks before the commencement at which the degree is to be awarded. Please note that candidates for the doctoral degree must be registered for Doctoral Dissertation (SOC 3820 or SOC 3799) during the term in which the dissertation is defended at the final oral examination.

Joint Program in Sociology/Anthropology and Education

For social science teachers in the public schools and in community or junior colleges, the Department of Sociology and Anthropology has combined its resources with those of the Department of Education in the Boston-Bouvé College of Human Development Professions to offer a concentration in sociology or social anthropology and education. In addition to the basic requirements (twenty-four quarter hours) for the master of arts degree either in sociology or in social anthropology, students who choose this option also take two sociology or anthropology electives (six quarter hours) and two education electives (eight quarter hours). The education electives are chosen from Area III courses and/or the Teacher Certification Program courses. Students should consult the catalog of the Boston-Bouvé Graduate School for details. The final requirement is SOC 3166, Sociology and Anthropology in the Schools. Doctoral students may also choose to emphasize in their studies research and scholarship in the sociological and anthropological analysis of education.

N.B.: Some of the requirements listed here for both the MA and PhD have undoubtedly been modified. Please check with the department and/or the Graduate School for the most recent information. This applies also to course offerings.

Course Listings

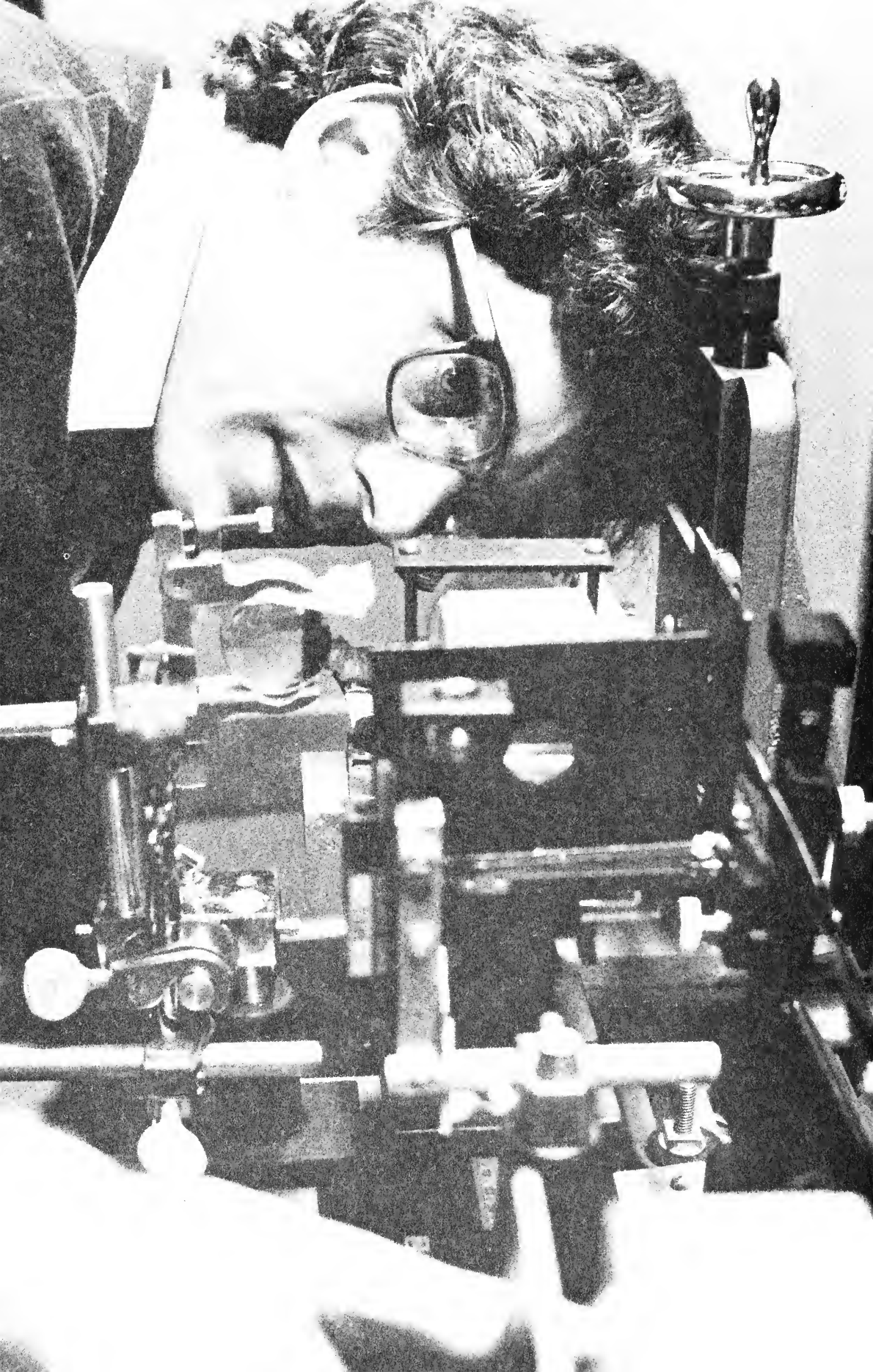
The following is a listing of all departmental course offerings. Please refer to the 1984–1985 *Graduate Course Descriptions* for course descriptions and relevant prerequisites.

Course No.	Course Name	Credit
SOA 3100	Theory	4 QH
SOA 3101	Human Origins	4 QH
SOA 3102	Evolution of Society	4 QH
SOA 3120	Visual Anthropology	3 QH
SOA 3121	Fieldwork 1	4 QH
SOA 3122	Fieldwork 2	4 QH
SOA 3135	Language and Communication	3 QH
SOA 3145	Peasant Society	3 QH
SOA 3155	Individual and Culture	3 QH
SOA 3156	Family in Evolutionary Perspective	4 QH
SOA 3185	Aggression	3 QH
SOA 3220	Culture and Mental Illness	3 QH
SOA 3265	Anthropology of Religion	3 QH
SOA 3275	Anthropology of Music	3 QH
SOA 3300	Cultural Ecology	3 QH
SOA 3310	Social Change and Economic Development	3 QH
SOA 3311	Social and Cultural Change	3 QH
SOA 3345	Urban Ethnography	3 QH
SOA 3355	Anthropology of Law and Conflict	3 QH
SOA 3360	Economic Anthropology	3 QH
SOA 3410	Contemporary Issues in Social Anthropology	3 QH
SOA 3411	Contemporary Issues in Social Anthropology	3 QH
SOA 3412	Contemporary Issues in Social Anthropology	3 QH
SOA 3413	Contemporary Issues in Social Anthropology	3 QH
SOA 3420	Kinship and Social Structure	3 QH
SOA 3425	Tribal Societies and Culture	3 QH
SOA 3440	Ethnographic Area Courses	3 QH
SOA 3441	Ethnographic Area Courses	3 QH
SOA 3442	Ethnographic Area Courses	3 QH
SOA 3443	Ethnographic Area Courses	3 QH
SOA 3444	Ethnographic Area Courses	3 QH
SOA 3445	Indian Culture	3 QH
SOA 3600	Seminar	3 QH
SOA 3601	Seminar	3 QH
SOA 3602	Seminar	3 QH
SOA 3800	Directed Study	3 QH
SOA 3801	Directed Study	3 QH
SOA 3802	Directed Study	3 QH
SOA 3810	Master's Paper in Social Anthropology	6 QH
SOA 3798	Master's Thesis Continuation	0 QH
SOC 3100	Foundations of Social Theory I	4 QH
SOC 3101	Foundations of Social Theory II	4 QH
SOC 3103	American Society	3 QH

Course No.	Course Name	Credit
SOC 3115	Introduction to Statistical Analysis in Sociology	4 QH
SOC 3116	Introduction to Research Methods	4 QH
SOC 3117	Quantitative Research Methods	4 QH
SOC 3120	Seminar in Qualitative Analysis I	4 QH
SOC 3121	Seminar in Qualitative Analysis II	4 QH
SOC 3125	Proseminar I	1 QH
SOC 3126	Proseminar II	1 QH
SOC 3127	Proseminar III	1 QH
SOC 3135	Issues in Social Psychology	3 QH
SOC 3140	Sociology of Prejudice and Discrimination	3 QH
SOC 3147	Urban Sociology	3 QH
SOC 3148	Boston Seminar	3 QH
SOC 3149	Metropolitan and Regional Issues	3 QH
SOC 3155	The Family	3 QH
SOC 3160	Women, Men and Social Change	3 QH
SOC 3165	Sociology of Education	3 QH
SOC 3166	Sociology and Anthropology in the Schools	4 QH
SOC 3170	Intergroup Relations	3 QH
SOC 3171	Race and Ethnic Relations: A World Perspective	3 QH
SOC 3175	Sociology of Work	3 QH
SOC 3176	Sociology of Occupations and Professions	3 QH
SOC 3185	Sociology of Deviant Behavior	3 QH
SOC 3186	Social Control I	3 QH
SOC 3187	Social Control II	3 QH
SOC 3190	Sociology of Delinquency	3 QH
SOC 3200	Sociology of Alcoholism	3 QH
SOC 3205	Sociology of Crime and Justice	3 QH
SOC 3206	Sociology of Law	3 QH
SOC 3215	Sociology of Medicine	3 QH
SOC 3225	Sociology of Aging	3 QH
SOC 3226	Processes of Aging	3 QH
SOC 3240	Formal Organizations	3 QH
SOC 3245	Sociology of Poverty	3 QH
SOC 3275	Sociology of Art	3 QH
SOC 3276	Popular Culture	3 QH
SOC 3286	Sociology of Science	3 QH
SOC 3300	Contemporary Sociological Theories	3 QH
SOC 3301	Recent Developments in Sociological Theory	3 QH
SOC 3302	Sociology of Knowledge	3 QH
SOC 3303	Economic Sociology	3 QH
SOC 3310	Social and Cultural Change	3 QH
SOC 3320	Multiple Regression in Sociological Analysis	3 QH
SOC 3321	Current Issues in Social Research	3 QH
SOC 3322	Experimental Methods I	3 QH
SOC 3323	Experimental Methods II	3 QH
SOC 3325	Sociology of Policy, Planning, and Evaluation	3 QH
SOC 3335	Seminar in Symbolic Interaction	3 QH
SOC 3336	Seminar on Socialization I	3 QH
SOC 3337	Seminar on Socialization II	3 QH
SOC 3338	Seminar on Socialization III	3 QH
SOC 3345	Community Analysis	3 QH
SOC 3347	Seminar in Urban Sociological Policies	3 QH
SOC 3355	Political Sociology	3 QH
SOC 3357	Comparative Socialism	3 QH
SOC 3360	Social Stratification	3 QH
SOC 3365	Social Movements	3 QH
SOC 3390	Seminar in Social Structure I	3 QH
SOC 3391	Seminar in Social Structure II	3 QH
SOC 3405	Theories of Criminology	3 QH

Course No.	Course Name	Credit
SOC 3410	Contemporary Issues in Sociology	3 QH
SOC 3411	Contemporary Issues in Sociology	3 QH
SOC 3412	Contemporary Issues in Sociology	3 QH
SOC 3413	Contemporary Issues in Sociology	3 QH
SOC 3430	Latin American Societies	3 QH
SOC 3431	Middle East Area Study	3 QH
SOC 3470	Sociology of Religion	3 QH
SOC 3485	Computers and Society	3 QH
SOC 3600	Seminar	3 QH
SOC 3601	Seminar	3 QH
SOC 3602	Seminar	3 QH
SOC 3603	Rhetoric in Sociology	3 QH
SOC 3615	Tutorial in Teaching	*
SOC 3620	Doctoral Proseminar I	1 QH
SOC 3621	Doctoral Proseminar II	1 QH
SOC 3622	Doctoral Proseminar III	1 QH
SOC 3800	Directed Study in Sociology	3 QH
SOC 3801	Directed Study in Sociology	3 QH
SOC 3802	Directed Study in Sociology	3 QH
SOC 3810	Master's Paper in Sociology	6 QH
SOC 3820	Doctoral Dissertation	0 QH
SOC 3798	Master's Thesis Continuation	0 QH
SOC 3799	Doctoral Dissertation Continuation	0 QH

*Maximum of three quarter hours credit.



General Information

Facilities and Resources

In 1910, Northeastern University began new construction on the first piece of land acquired at its present Huntington Avenue site. Since those early days, the central Boston campus has grown to occupy over fifty acres of land located near to such cultural landmarks as Symphony Hall, the Museum of Fine Arts, the Isabella Stewart Gardner Museum, Horticultural Hall, and the Boston Public Library, among others. The University is within walking distance of Fenway Park, Copley Place, the Back Bay shopping district, and a number of renowned hospitals, including Brigham and Women's and other Harvard teaching hospitals.

In addition to five suburban campus and branch locations and several off-campus athletic facilities, Northeastern University maintains a variety of affiliations that provide its students access to facilities and specialized equipment at other institutions or from other organizations.

The Boston Campus

The central Boston Campus is built around a quadrangle, one side of which faces Huntington Avenue, a major artery dividing the campus. The buildings surrounding the quadrangle characterize the urban design of the campus, and the innovative design of new buildings added in recent years has maintained an architectural theme that is both attractive and functional.

The campus itself has been planned to provide easy access to classrooms, laboratories, and administrative offices through a series of connected walkways and a network of underground corridors, providing routes that are especially convenient during periods of inclement weather.

Suburban Facilities

Northeastern University's five suburban campuses provide administrative and classroom facilities for the University's graduate, adult, and continuing education programs as well as the environment necessary for specific programs of study that could not be accommodated in an urban area.

The Warren Center provides a practical laboratory in outdoor education and conservation and in camping administration,

programming, and counseling. It also offers a summer campsite for various community and University groups and activities and is available as a conference and workshop site.

The Marine Science and Maritime Studies Center is located in Nahant, on Massachusetts Bay, twenty miles northeast of Boston, and serves as a site for national and international as well as University research.

Henderson House is Northeastern University's conference center. Located twelve miles from Boston in suburban Weston, Henderson House hosts a variety of round-the-clock activities, including residential seminars, workshops, short courses, and weekend meetings.

The Suburban Campus of Northeastern University is located in Burlington, near the junction of routes 128 and 3. Graduate courses in engineering, business administration, and education as well as undergraduate courses for part-time students are offered here. The Burlington Campus also offers special programs for adults and noncredit continuing education courses.

The Suburban Campus is situated close at hand to another Northeastern University facility, the Botanical Research Station in Woburn, which contains a small arboretum and a spacious greenhouse used for propagation and research.

One of the most recent campus acquisitions is the twenty-acre Dedham Campus, just north of Route 128. This recently renovated facility provides space for the College of Business Administration's new High Technology MBA program and offices for the Center for Continuing Education and the Insurance Institute.

Libraries

The University library system includes the Dodge Library and the three graduate libraries: Chemistry (which includes chemical engineering, biology, pharmacy, and the health sciences), Physics/Electrical Engineering, and Mathematics/Psychology. The Suburban Campus Library supports the programs at Burlington and Dedham. Other collections are housed at the Marine Science and Maritime Studies Center in Nahant, at the Dedham Campus, and at the Center for Management Development in Andover. There is also the Law Library located in the Knowles Center.

The University library collections consist of over 505,000 bound volumes and 555,000 microform volumes. There are also 4,000 periodical titles, 1,243 additional continuation titles, and 10,000 sound recordings.

The Northeastern libraries have computerized many operations internally and, in addition, hold membership in the New England Library Information Network. NELINET has been estab-

lished for the purpose of developing and operating major library support services. It is a network of libraries devoted to sharing financial, human, and material resources to reduce cost and redundancy and to improve on the timeliness and increase the variety of services available.

Academic Computer Services

Academic Computer Services supports the research activities of faculty, research personnel, and graduate students, as well as the teaching and learning activities at both the graduate and undergraduate levels. The computational capability of this facility is supplied by three Digital Equipment Corporation VAX-11/780 systems and one Data General Corporation MV/8000. Each of these systems is a state-of-the-art thirty-two-bit virtual memory machine optimized and designed for interactive computing. In addition, there are ten Digital Equipment Corporation LSI-11 microcomputers, each configured with dual floppy disks and video terminals. For more advanced applications, a multi-terminal Computervision Computer-Aided-Design/Computer-Aided-Manufacturing (CAD/CAM) system is available.

Both students and faculty access these systems in a time-sharing environment through video and hard-copy terminals arranged in student and faculty clusters at the Boston, Burlington, and Dedham campuses. There are also a number of dial-in telephone lines, primarily for faculty use. Color-graphics devices and word-processing packages are also available. The primary languages supported are FORTRAN, COBOL, BASIC, Pascal, and Assembler. Numerous software libraries are available for numerical, statistical, and financial applications. Both faculty and students can readily obtain programming assistance, in order to promote the effective use of all facilities.

Graduate Student Housing

Full-time graduate students enrolled in a graduate program may reside in a University apartment facility. Assignments are made on a first-come, first-served basis after an application and deposit are received. There are no accommodations for married students in University housing. The University also maintains listings of off-campus rooms and apartments.

Department of Career Development and Placement

The Department of Career Development and Placement offers a wide range of counseling and placement services to all seniors, graduate students, and alumni of Northeastern University seeking employment, as well as to students interested in participating in nonpaid, part-time internships in private or public nonprofit agencies, for which they may receive academic credit.

Through this department, representatives of hundreds of employers are scheduled to visit the campus each year to inter-

view seniors and graduate students for full-time employment after graduation. A job bank of currently available positions is maintained for alumni who are seeking new opportunities for which they may be qualified. Credential service is provided for students and alumni seeking positions in the field of education and for applicants to graduate and professional schools. Regularly scheduled seminars are conducted for seniors, graduate students, and alumni on career development, job-finding techniques, resume preparation, and effective interviewing. Individual career counseling is available for seniors, graduate students, and alumni of all University programs.

Sports, Dance, and Exercise Facilities

Through its Cabot Center for Physical Education, Dockser Hall, and Barletta Natatorium, Northeastern University offers a wide variety of specialized facilities, including basketball courts, a dance studio, an indoor athletic field and running track, a gymnastics room, a combative sports room, weight-training rooms, a swimming pool, a crew practice tank, handball courts, and motor performance and exercise physiology laboratories. The Matthews Arena, with seating for more than 5,000 fans, provides home ice to the University's varsity and subvarsity hockey teams and, when the portable playing floor is down on the ice, home court to the University's basketball teams.

For organized athletic activities requiring facilities not available on the main campus, Northeastern maintains several off-campus locations, including the Northeastern Boat House, which is located on Memorial Drive in Cambridge and provides a home for the University's crew teams. The Edward S. Parsons Field, on Kent Street in Brookline, is the playing ground for the varsity football and baseball teams.

Ell Student Center

The Carl S. Ell Student Center provides facilities for student recreation and extracurricular activities. The Alumni Auditorium, with a seating capacity of 1,300, is part of the center. Also included are special drama facilities, a ballroom, a main lounge, a fine arts exhibition area, student offices, conference rooms, a cafeteria with seating for more than 1,000, and the bookstore.

Lane Health Center

A comprehensive program of medical care is provided to all full-time graduate and undergraduate students. The University maintains a Health Services Clinic, which is open for emergencies at all times and is equipped to deal promptly with any medical condition that may arise. All entering full-time students must submit a pre-entrance physical examination form provided by the Lane Health Center prior to registration. Fail-

ure to fulfill this requirement can delay registration and result in a penalty fee and an additional fee for a physical examination.

Counseling and Testing Center

Counseling and testing to aid a student or prospective student with career, educational, or personal concerns are available days and certain weekday evenings until 8:30 p.m. Information and appointments may be obtained by calling 617-437-2142 or by visiting the Counseling and Testing Center.

Office of Services for the Handicapped

Any student who has a disability-related special need, no matter how minor or individual, can receive ready support services from the Office of Services for the Handicapped (OSH). Frequently, students are uncertain about how they may be aided by this office, and in these situations a discussion of possible alternatives can be quite helpful. OSH provides a wide range of support services to eliminate the competitive disadvantages that a disability may create. Services are individually tailored to meet the needs of each student.

The types of assistance available from OSH include orientation, help with registration and preregistration, operating as an information clearinghouse, counseling, assistance in finding housing, and services for the visually impaired, hearing-impaired, and wheelchair-using or mobility-impaired student.

OSH is also the gathering place for the Disabled Student Organization of Northeastern University, which works cooperatively with OSH to plan programs and improve accessibility of services for handicapped persons at Northeastern.

Office of Multicultural Student Affairs

The Office of Multicultural Student Affairs was created for the purpose of meeting the needs of Third World students. The office oversees the coordination and implementation of support services provided by the English Language Center and the International Student Office. Moreover, the Office of Multicultural Student Affairs provides advocacy representation at the upper level of University administration, thereby ensuring that the needs of Third World students are being comprehensively addressed.

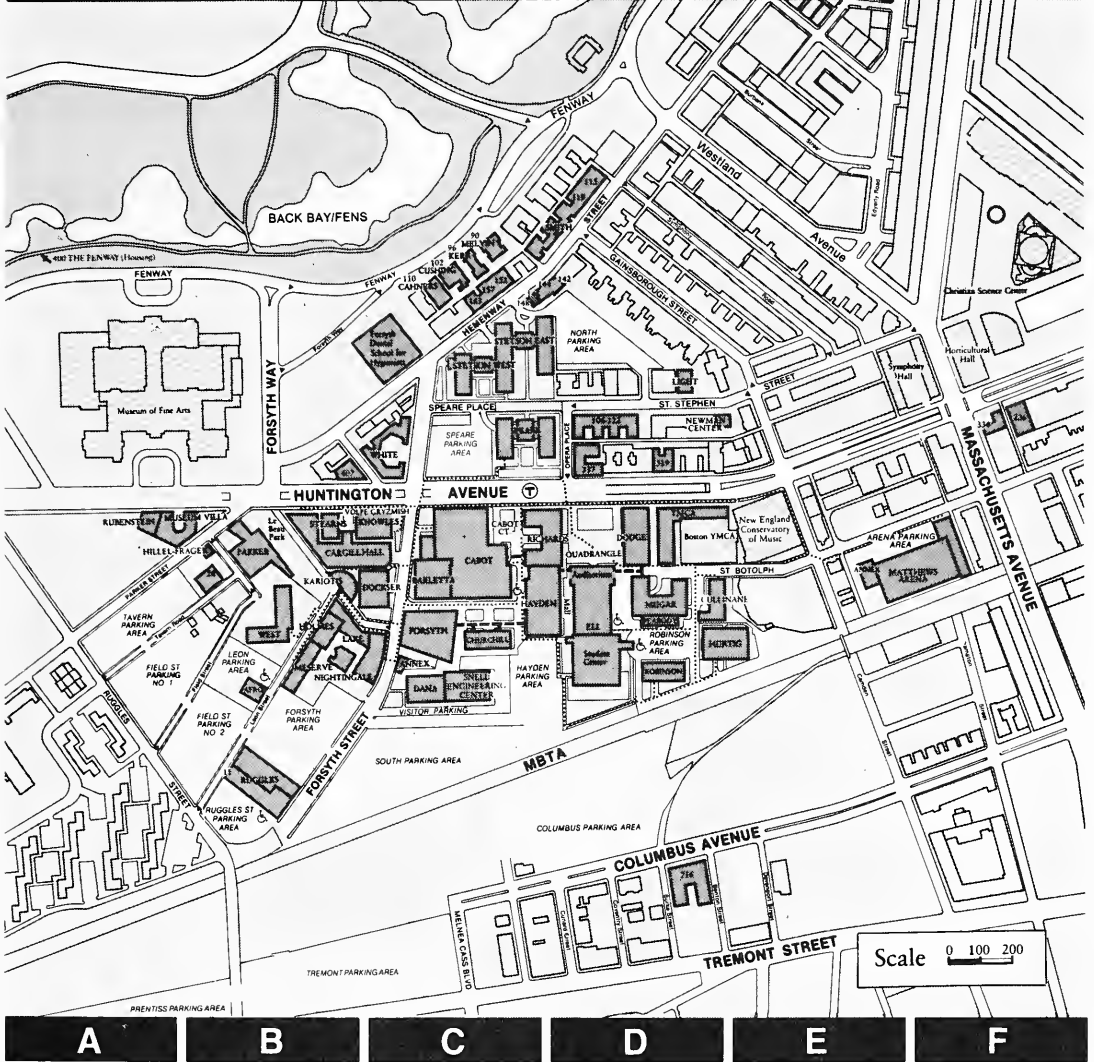
Network Northeastern (NNU)

Network Northeastern (NNU) represents the University's entry into the age of education by telecommunications. The network's main mode of operation utilizes the microwave-based Instructional Television Fixed Service (ITFS) system, by means of which educational services are delivered directly to company sites and other remote locations within a thirty-mile radius of Northeastern's Boston Campus. With this service, live class-

room instruction is telecast in color to remote sites, where it is viewed in reception rooms equipped with television monitors and a telephone-based talk-back system. During the presentation, the off-campus students are able to participate as fully in the instruction as can students sitting in the originating classroom on campus. A courier service is provided to collect and deliver homework assignments and to serve as the off-campus students' link to the bookstore, Registrar, and other campus services.

Network Northeastern currently offers courses in graduate engineering, undergraduate engineering technology and selected arts and sciences topics. This instruction is telecast daily between 8:00 a.m. and 10:00 p.m. on four channels to off-campus students at fifteen company sites and two suburban campuses.





Academic and Service Buildings

B	African-American Institute
C	Barletta Natatorium
DE	Boston YMCA
C	Cabot Physical Education Building
C	Cahners Hall
B	Cargill Hall
C	Churchill Hall
D	716 Columbus Avenue
DE	Cullinane Hall (Boroloph)
C	Cushing Hall
C	Dana Research Center
B	Dockser Hall
D	Dodge Library
D	Ell Student Building (Auditorium)
D	Ell Student Center (Student Lounge)
C	Forsyth Building
C	Forsyth Building Annex
C	Hayden Hall
A	Hillel-Frager
B	Holmes Hall
F	236 Huntington Avenue
DE	Hurtig Hall

B	Kariotis Hall
C	Kerr Hall (Faculty Center)
B	Knowles Center (Gryzmish Hall)
B	Knowles Center (Volpe Hall)
B	Lake Hall
F	334 Massachusetts Avenue
F	Matthews Arena
EF	Matthews Arena Annex
B	Meserve Hall
D	Mugar Life Science Building
D	(Peabody Health Professions Center)
DE	Newman Center
B	Nightingale Hall
B	Parker Building
D	Peabody Center
C	Richards Hall
D	Robinson Hall
AB	Ruggles (11 Leon Street)
C	Snell Engineering Center
D	122 St. Stephen Street
B	Stearns Center
A	26 Tavern Road

Key

Academic, Residential,
and Service Buildings

Handicapped Parking

Handicapped Routes

Parking Areas

Public Buildings

Public Parks

Street Direction

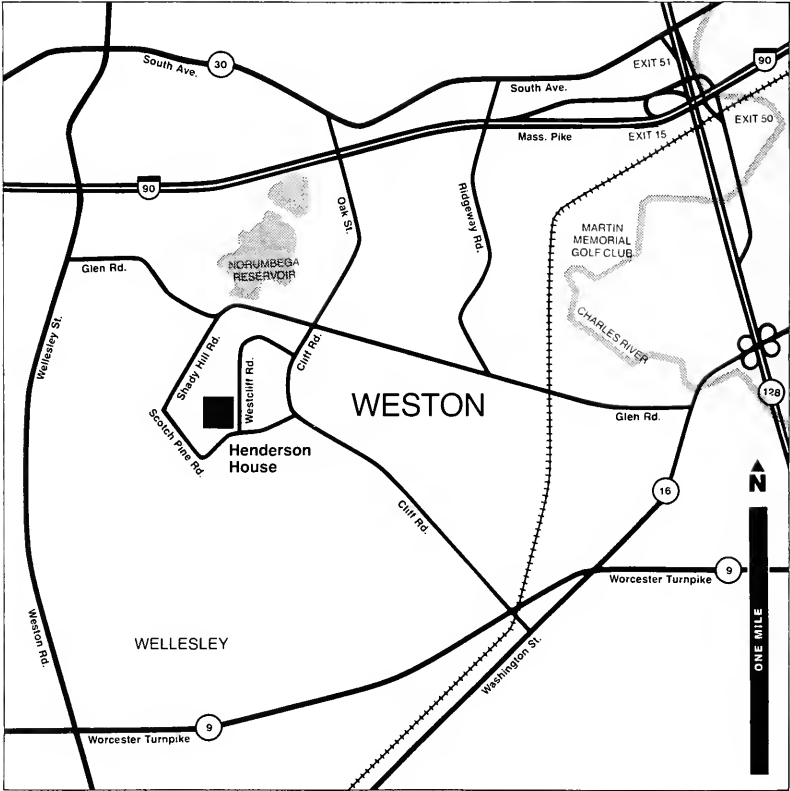
Underground Tunnel

Maps are provided by the
Visitor Information Center,
115 Richards Hall, extension 2736.
Some buildings on this map are used but
not owned by Northeastern University.
NUP 6.11.4

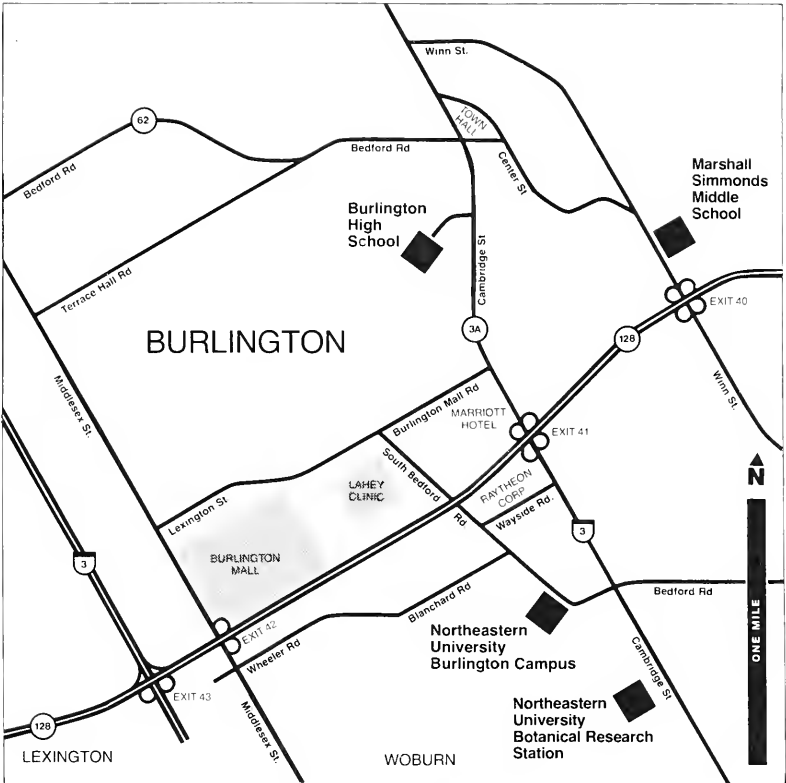
The Warren Center



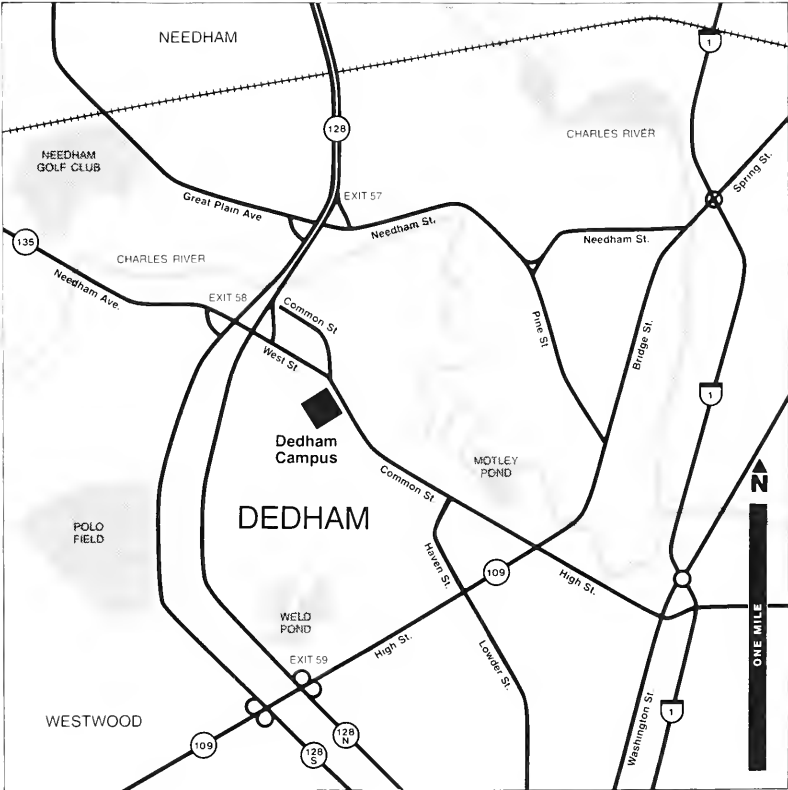
Henderson House



Burlington Campus



Dedham Campus



The Governing Boards and Officers of the University

The Corporation

- | | |
|-------------------------|--------------------------|
| Julius Abrams | Logan Clarke, Jr. |
| *William F. Allen, Jr. | Livingston N. Coakley |
| Yousef A. As'ad | †David H. Cogan |
| **Diana J. Auger | Abram T. Collier |
| | T. Paul Connolly |
| *Vincent Barletta | James J. Costello |
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Graduate Schools Course Descriptions

Arts and
Sciences

**Northeastern University
1984-85**

Northeastern University

1984–85

Graduate Schools Course Descriptions

Arts and Sciences

The University reserves the right to make changes in the regulations and courses announced in this bulletin.

**Northeastern
University Publications
10.11.4**

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Northeastern will do its best to make available to you the finest education, the most stimulating atmosphere and the most congenial conditions it can provide. But the quality and the rate of progress of your academic career is in large measure dependent upon your own abilities, commitment, and effort. This is equally true with respect to professional advancement upon completion of the degree or program in which you are enrolled. The University cannot guarantee that you will obtain or succeed at any particular job; that will depend upon your own skills, achievement, presentation and other factors such as market conditions at that time. Similarly, in many professions and occupations there are increasing requirements imposed by federal and state statutes and regulatory agencies for certification or entry into a particular field. These may change during the period of time when you are at Northeastern and they may vary from state to state and from country to country. While the University stands ready to help you find out about these requirements and changes, it is your responsibility to initiate the inquiry because the University has no other way of knowing what your expectations and understandings are.

In brief, the University is there to offer you educational opportunities and choices and to assist you in finding the direction in which you want to steer your educational experience, but you are a partner in this venture with an obligation and responsibility to yourself.

Northeastern University's Antidiscrimination Policy

Northeastern University is committed to a policy of equal opportunity for all students and employees without regard to race, color, religion, sex, sexual preference, national origin, or handicap or veteran status. The University prohibits discrimination in all matters involving admission, registration, and all official relationships with students, including evaluation of academic performance.

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Further, Northeastern will not condone any forms of sexual harrassment which is defined as the use of unwelcome sexual advances, requests for favors, and other verbal or physical conduct of a sexual nature: as an explicit or implicit condition of employment, as the basis for employment decisions or to interfere with an individual's work performance by creating an intimidating, hostile, or offensive work environment.

Inquiries concerning our equal opportunity policies may be referred to the University Title IX Coordinator/ Compliance Officer for Section 504 of the Rehabilitation Act of 1973, Affirmative Action Office, Richards Hall. Telephone: 617-437-2133.

Accreditation Statement

Northeastern University is accredited by the New England Association of Schools and Colleges, Inc., which accredits schools and colleges in the six New England states. Accreditation by the Association indicates that the institution has been carefully evaluated and found to meet standards agreed upon by qualified educators.

Tuition rates, all fees, rules and regulations, courses and course content are subject to revision by the President and the Board of Trustees at any time.

The following is a list of courses offered by the graduate school of Arts and Sciences.

To obtain course listings for Boston-Bouvé College of Human Development Professions and the schools of Criminal Justice, Computer Science, Engineering, Pharmacy and Allied Health Professions, and Professional Accounting, see the *Graduate Schools Course Descriptions* catalog.

To obtain course listings for the schools of Business and of Law, please refer to their respective catalogs.

In order to register for courses outside one's graduate school, students must meet the requirements of the school offering the course(s) as well as their home school.

Students may not register for any courses outside their school unless the appropriate permit is presented at registration. Consult your graduate school office for details concerning these procedures.

Arts and Sciences

Arts and Sciences

Anthropology and Sociology

All courses carry three quarter-hours of credit unless otherwise specified.

Social Anthropology

Many undergraduate courses in the SOA 300 and 400 series may be offered for graduate credit. Students should check the current course announcements to take advantage of these offerings.

SOA 3100 Theory 4 Q.H.

History of major contemporary orientations: evolutionary approaches, culture area, cultural ecology, functionalism, structuralism, and analysis of current status of these and related theories.

SOA 3101 Human Origins 4 Q.H.

An examination of the data on fossil remains and on contemporary primates which are essential for understanding human physical and behavioral evolution.

SOA 3102 Evolution of Society 4 Q.H.

The development of political and economic institutions beginning with foraging societies and the sexual division of labor: specialization, social stratification and the emergence of civilization.

SOA 3120 Visual Anthropology

Explores the anthropologist's use of film to gather information and analyze cultural subsystems. In addition to reading about and viewing films on particular populations, students are introduced to the field through a laboratory aspect of the course involving the use of tape and video equipment.

SOA 3121, SOA 3122 Fieldwork I, II

4 Q.H. each

Data collection through participant observation and related anthropological methods. Data analysis and reports. (Not offered in years in which SOC 3120 and SOC 3121 are offered.)

SOA 3135 Language and Communication

Human communication, including language. Theories of the evolution of language and the application of models derived from the study of language to other aspects of behavior.

SOA 3145 Peasants

Institutions of peasant society. The structure of traditional civilizations and the interrelations between urban and local communities: comparative and functional analysis of the peasant community and the dynamics of change from peasant to post-peasant and industrialized societies.

SOA 3155 Individual and Culture

Examination of current theory and method in the study of the interplay between personality and culture. Contributions by various disciplines are discussed.

SOA 3156 Family in Evolutionary Perspective

4 Q.H.

The emergence of family from prehuman patterns, its biological and behavioral components, and its cross-cultural variations examined from an evolutionary perspective.

SOA 3185 Aggression

Concepts of aggression as they have been used in evolutionary and comparative anthropological formulations. Professional and popular publications in anthropology, ethology, and psychology are analyzed.

SOA 3220 Culture and Mental Illness

Discussions and analyses of the nature and meaning of culture, the role of culture in personality formation, culture and anxiety, anthropological approaches to the normal and the "abnormal," and the question, "Is mental illness psychological fact or cultural fiction?"

SOA 3265 Anthropology of Religion

Nature and institutionalization of primitive, ancient, and contemporary religions. Exploration of religious concepts and movements in relation to social, religious, and political organization.

SOA 3275 The Anthropology of Music

The examination of music in a prehistoric and cross-cultural perspective, with emphasis on ethnomusicology and the comparison of Western and non-Western musical culture. Functions and social contexts of musical composition and performance; the ethnography of musical performance groups, the analysis of music as a form of communication.

SOA 3300 Cultural Ecology

Examines human adaptation to environment and the effect of different human adaptations on natural systems.

SOA 3310 Social Change and Economic Development

Selected studies of processes of transformation and modernization in nonindustrial societies.

SOA 3345 Urban Ethnography

Selected problems in anthropological studies in urban societies.

SOA 3355 The Anthropology of Law and Conflict

Settling disputes in stateless societies; forms and mechanisms of social control; law as an indicator of cultural and social norms; the study of conflict resolution as an ethnographic tool. Some field research and analysis is required.

SOA 3360 Economic Anthropology

Types of economic systems in simple societies: reciprocal, redistributive, market exchange; economic relations as part of social relations; land-tenure systems, credit systems, savings mechanisms. The transition from subsistence to cash economics.

SOA 3410, SOA 3411, SOA 3412, SOA 3413

Contemporary Issues in Social Anthropology

3 Q.H. each

Contemporary issues in the field of anthropology. Supervised readings and written reports on special programs.

SOA 3420 Kinship and Social Structure

A variety of kinship systems and their terminological and structural components and the way in which their systems articulate with other social institutions.

SOA 3425 Tribal Societies and Culture

The structures and institutions of bands, tribes, and chiefdoms: comparative and functional studies of tribal societies and the dynamics of change under contact situations.

SOA 3440, SOA 3441, SOA 3442, SOA 3443, SOA 3444, SOA 3445

Ethnographic area courses (New World Indian, African, Indian, Chinese, and others) are offered as resources permit.

SOA 3600, SOA 3601, SOA 3602 Seminar

3 Q.H. each

Discussion of selected topics in the field of anthropology.

SOA 3798 Master's Thesis Continuation 0 Q.H.

SOA 3800, SOA 3801, SOA 3802 Directed Study in Social Anthropology

Maximum: 9 Q.H.

Reading and empirical research in social and cultural anthropology supervised by members of the anthropological staff.

SOA 3810 Master's Paper in Social Anthropology

6 Q.H.

Empirical or library research meeting the criteria for publication in a professional journal. *Supervision by members of the department.*

Sociology

Many undergraduate courses in the SOC 300 and 400 series may be offered for graduate credit. Students should check the current course announcements to take advantage of these offerings.

SOC 3100 Foundations of Social Theory I

4 Q.H.

The classic theorists (Durkheim, Weber, Marx, Simmel, and others) are considered intensively.

SOC 3101 Foundations of Social Theory II

4 Q.H.

An intensive analysis of modern theorists from the 1930s onward (Parsons, Merton, Levi-Strauss,

Goffman, Homans, Schutz, Garfinkel, Ricoeur, Lukacs, Habermas, and others). The social and historical context of theory construction is stressed.

SOC 3103 American Society

Study of the development of, and the changes in, the institutional structure of American society in comparison with certain other social systems.

SOC 3113 Introduction to Research Methods

2 Q.H.

An introduction to methods of social research including field study and participant observation techniques, survey techniques, interviewing and questionnaire construction, sampling procedures, experimental design, content analysis, and uses of available data. *Open only to law, policy and society students.*

SOC 3114 Introduction to Quantitative Research Methods

2 Q.H.

An introduction to quantitative techniques of analysis. Students are expected to conduct individual research projects. *Open only to law, policy and society students. Prereq.: SOC 3113 or equivalent.*

SOC 3115 Statistical Methods for Sociologists

4 Q.H.

Detailed introduction to statistical methods relevant to sociology. Topics include tabular analysis, nonparametric statistics, analysis of variance, regression analysis, path analysis, measures of association, estimation and univariate and multivariate hypothesis testing. A knowledge of elementary statistical theory is presumed.

SOC 3116 Introduction to Research Methods

4 Q.H.

A survey of methods of social research including field study and participant observation techniques, survey techniques, interviewing and questionnaire construction, sampling procedures, experimental design, content analysis, and use of available data.

SOC 3117 Quantitative Research Methods

Quantitative techniques of analysis. Students are expected to conduct individual research project. *Prep.: SOC 3116 (or equivalent) or consent of the instructor.*

SOC 3120, SOC 3121 Seminar in Qualitative Analysis I, II

4 Q.H. each

Qualitative techniques of analysis. Social-structure process and meaning in interacting groups. Each student is expected to study a face-to-face group by means of participant observation using symbolic interaction concepts. *(Not offered in years in which SOA 3121 and SOA 3122 are offered.)*

SOC 3125, SOC 3126, SOC 3127 Proseminar

1 Q.H. each

This course is suggested for entering students. The focus is on issues related to graduate student

life and expectations, professional and career choices, and works in progress. Students have an opportunity to explore more informally, with each other and with various faculty members, some of the important issues in the profession.

SOC 3135 Issues in Social Psychology

Human behavior and theories of self from a sociological and psychological perspective. Special consideration of interpersonal relations, socialization, and symbolic interaction.

SOC 3140 Sociology of Prejudice and Discrimination

A study of the characteristics, causes, and consequences of prejudice and discrimination, with particular reference to American society.

SOC 3147 Urban Sociology

Theories of the development of urban life. Comparisons between preindustrial and industrialized urban areas. Methods for the study of urban social structure and change. Evaluation of contemporary metropolitan action programs.

SOC 3148 Boston Seminar

A case study in urban development, including the evaluation of environmental and historical circumstances, demands for services, response to events, programs. Basis for value systems of Yankees, ethnics, and cosmopolitans. Impact on downtown and neighborhood relations. Metropolitan prospects.

SOC 3149 Metropolitan and Regional Issues

Comparative analyses of problems, policies, programs, and activities associated with metropolitan and regional life. Includes assessment of values, institutions, networks, interest groups, decision making, service delivery, growth and development, environment, equity, and integration. Case studies in societal context.

SOC 3155 The Family

Social structure and social functions of the family as a social institution. Relations between the family and other institutions in society are examined comparatively and historically.

SOC 3160 Women, Men, and Social Change

The Industrial Revolution and the corresponding changes in the labor force and patterns of domestic life have altered the sexual division of labor. In postindustrial society new institutional forms are recasting personal relations. The course examines these forces of social change and their impact on sex roles.

SOC 3165 Sociology of Education

The structure and functioning of educational institutions. Student, faculty, and administrative perspectives. Emphasis is placed on the role of education in processes of socialization, social mobility, social change, and social control.

SOC 3166 Sociology and Anthropology in the Schools 4 Q.H.

(Listed as ED 3322 in the Boston Bouvé Graduate School catalog) The course offers a setting in which current and prospective teachers of sociology and anthropology at the precollege and community college levels have the opportunity to analyze curricula in their fields and consider alternative rationales for various approaches to teaching sociology and anthropology at these levels. Study also focuses on the potential uses of sociological and anthropological concepts in analyzing and solving educational problems. Students are expected to present either a course or unit they have prepared or a project they have planned or conducted utilizing a sociological or anthropological perspective.

SOC 3170 Intergroup Relations

The relations between various racial, national, cultural, and religious groups with emphasis on historical development. Particular attention is paid to American society with its specific problems of adjustment and assimilation.

SOC 3171 Race and Ethnic Relations: A World Perspective

Cross-cultural analysis of race and ethnic relations in Western and non-Western societies. Explanations of race and ethnic relations in terms of contemporary developments, world problems, and ideological conflicts.

SOC 3175 Sociology of Work

The course is designed to examine the effects which the social organization of work has on the lives of workers as well as on the structure of society.

SOC 3176 Sociology of Occupations and Professions

The relations between the occupations and professions and society. Special topics may include occupational stratification, professional group behavior, recruitment and socialization of occupations and professions, and political activism.

SOC 3185 Sociology of Deviant Behavior

Applications of sociological concepts and principles to some problems of social disorganization in industrial societies. Analysis of such problems as suicide, prostitution, physical handicaps, unemployment, alcoholism, sexual deviance, and gambling.

SOC 3186, SOC 3187 Social Control I, II

Seminar in research, theories, and methods in the sociology of social control.

SOC 3190 Sociology of Delinquency

Social and social psychological factors of delinquency and their implications for prevention, rehabilitation, and treatment.

SOC 3200 Sociology of Alcoholism

The course examines four general problem areas: the conditions under which people categorize others as alcoholics; the processes by which persons so defined are assigned deviant status and assume appropriate roles and self-images as alcoholics; the development of drinking careers and their relationship to deviant subcultures; and the social situations in which people transform their deviant identities as alcoholics. The course applies organizational analysis to the development and changing network of alcoholism treatment services and tries to develop some tentative generalizations on the social organization of alcoholism.

SOC 3205 Sociology of Crime and Justice

A sociological and legal analysis of the criminal justice system, concentrating on police and law enforcement; plea-bargaining; courtroom research and trial strategies; sentencing; and prisoners' rights and corrections. The relationship between race, social class, and crime is also considered, as are the sociological explanations of crime causation.

SOC 3206 Sociology of Law

Fundamentals of law. The concept of social control. Order and law. Consensus and conflict. Analysis of the normative-formative influences of law. Mores and morals. The concept of justice. Analysis of some legal institutions.

SOC 3215 Sociology of Medicine

Social aspects of illness and medicine, historically and cross-culturally. Illness and the medical profession in modern society and their structural settings: the community, the hospital, the medical school. Research studies in the field are examined critically and problems for future research specified.

SOC 3225 Sociology of Aging

A critical examination of the field of social gerontology, the nature and roots of ageism and topics such as elderly housing, life study, institutionalization, health care, retirement, leisure, and senior power.

SOC 3226 Processes of Aging

Socioeconomic and social psychological consequences of aging are examined from the perspective of health-care providers. A major part of the course focuses directly on the biological changes entailed in aging and the appropriate medical management of geriatric patients. Open to students expected to provide health-care services to geriatric patients.

SOC 3240 Formal Organizations:

Administration and Structure

Analysis of the goals and functions of modern organizations. Aspects of bureaucratization are examined within business firms, public institutions, and private associations.

SOC 3245 Sociology of Poverty

An analysis of sociological perspectives on causes of poverty, public views on poverty, and institutional responses to poverty. A concern with policy issues and implementation of policies is emphasized. For advanced students in the social sciences and in the various human service schools in the University.

SOC 3275 Sociology of Art

Examination of the practices which lead to the production of artistic meaning; the relationship of art to society; the nature of artistic communities, their relationship to patronage systems and art markets; the manner in which these systems are rooted in particular social and historical contexts.

SOC 3276 Popular Culture

Both pluralist and mass culture theories are inadequate in explaining mass popular culture; therefore, a primary objective of the course is to develop and refine an efficient theoretical framework. Problems to be addressed include the relationship between popular culture, high culture, and folk culture and the genesis and role of the mass media in industrial societies. The course also focuses on empirical research in several forms of popular culture, including sports, rock music, and science fiction novels. Organization and impact of market, stylistic shifts, and the viability of criticism are examined.

SOC 3286 The Sociology of Science

Selected topics dealing with interactions between science and society.

SOC 3300 Contemporary Sociological Theories

Analytic treatment of major contemporary theories such as functionalism, conflict, neo-Marxism, and others. *Prep.: SOC 3100 and SOC 3101 (or equivalent) or consent of the instructor.*

SOC 3301 Recent Developments in

Sociological Theory

New horizons in theory and the relation of theory to research. Topics to be selected and announced by the instructor. *Prep. SOC 3100 and SOC 3101 (or equivalent) or consent of the instructor.*

SOC 3302 Sociology of Knowledge

The relationship between the social base of a society and its intellectual products. The viewpoints of authors such as Marx, Weber, Mannheim, G.H. Mead, the Neo-Marxians, and other modern schools are considered. *Prep.: SOC 3100 and SOC 3101 (or equivalent), or consent of the instructor.*

SOC 3303 Economic Sociology

The role of economic factors in the social process. Consideration is given to both classic economic theory and its impact on classic social theory, and the potential interrelations between modern economic theory (especially model-building approaches) and general sociological problems.

SOC 3310, SOA 3311 Social and Cultural Change S,A

Two-quarter course in conjunction with Anthropology. Analysis of the changing patterns in social, economic, and political institutions. Modern social trends are discussed.

SOC 3320 Multiple Regression in Sociological Analysis

This course focuses on techniques of sociological analysis based on multiple regression, e.g., use of coded variables, trend analysis, covariance analysis, model testing. *Prep.: SOC 3117 and SOC 3115 (or equivalents).*

SOC 3321 Current Issues in Social Research

Selected topics in methods of social research are examined. *Prep.: SOC 3116 and SOC 3117 (or equivalent) or consent of the instructor.*

SOC 3322, SOC 3323 Experimental Methods in Social Research I, II

Experimental design and laboratory methods in sociology. The small groups laboratory is treated as a setting for testing sociological theory. The emphasis is upon techniques and problems in the creation and manipulation of social variables in the laboratory situation, although the techniques of the natural experiment are also considered.

SOC 3325 Sociology of Policy, Planning, and Evaluation

A general introduction to the social, political, and economic factors affecting policy formation and the eventual success or failure of social programs in health, education, welfare, and urban planning. Stress on evaluation of policy alternatives and planning problems. For advanced students in the social sciences and in the various human service schools of the University.

SOC 3335 Seminar in Symbolic Interaction

The social psychology of groups as found in the works of Mead, Becker, Blumer, Goffman, and others.

SOC 3336, SOC 3337, SOC 3338 Seminar on Socialization I, II, III

I) Instructor reviews theories and findings in organizational socialization. II) Students are expected to design studies in organizational socialization. III) Students are required to present results of their studies. *Not open to first year students.*

SOC 3345 Community Analysis

Ecological theories of human relations with the physical environment. Development of the concept of, and discussion of methods for, community study. Comparison between rural communities and urban neighborhoods. Discussion and evaluation of community action programs.

SOC 3347 Seminar in Urban Social Policies

Social science theories and methods evaluated from the perspectives of urban affairs. *Consent of instructor.*

SOC 3355 Political Sociology

Sociological analysis of power relations and power systems with special attention to the bases of political power, processes of change in power, and the part played by violence and revolutionary movements.

SOC 3357 Comparative Socialism

Analysis of twentieth century socialism from a comparative perspective. The variety of "socialisms" that have developed in the Soviet bloc, China, Yugoslavia, and Cuba, as well as Western social democracy (Sweden) and Eurocommunism. Topics include political structure, class relations, industrial organization, cultural formations, dynamics of change, and democratization.

SOC 3360 Social Stratification

Theories of inequality between groups in historical perspective, from classical to modern industrial times. Discussion and evaluation of sociological research in social stratification with regard to different social and cultural groups.

SOC 3365 Social Movements

A study of various movements for social change from all points of the political spectrum. Special attention will be given to the structural context, as well as to such processes of social movements as social base, leadership, strategy, and organization.

SOC 3390, SOC 3391 Seminar in Social Structure I, II

Seminar relating current theories and research in sociology, social psychology, and social anthropology.

SOC 3405 Theories of Criminology

Theories and philosophies underlying various correctional systems. Schools of thought in criminology and penology. Theoretical approaches to the crime and delinquency problem from the beginnings of criminology to current thinking.

SOC 3410, SOC 3411, SOC 3412, SOC 3413

Contemporary Issues in Sociology 3 Q.H. each
Contemporary issues in sociology. Supervised readings and written reports on special problems.

SOC 3430 Latin American Societies

Study and analysis of selected Latin American societies with particular attention to such countries as Cuba, Mexico, Peru, and Brazil. Emphasis on urbanization and industrialization, social and political change.

SOC 3431 Middle East Area Study

Sociocultural analysis of the Middle East. Ecological, structural, institutional, and normative factors in nomadic, rural, and urban life. Comparative regional analysis.

SOC 3470 Sociology of Religion

A sociological analysis of religious institutions and experiences in their historical and contemporary

rary content. Religion context and political context are considered.

SOC 3485 Computers and Society

Graduate seminar on the social impact of the computer "revolution" on the contemporary world. Topics include conditions of work, education, recreation, privacy, the computer science profession, paradigms of human thought, politics, and social change in the world economy.

SOC 3600, SOC 3601, SOC 3602 Seminar

3 Q.H. each

Discussion of selected topics in the field of sociology.

SOC 3603 Rhetoric in Sociology

Critical examination of the conventional forms of sociological writings. How conventions differ by theoretical perspective and paradigm.

SOC 3615 Tutorial in Teaching 3 credits max.

Discussion of issues and problems in teaching. This is a required course for all doctoral candidates and should be taken during a quarter when the student has major responsibility for designing and executing a course in either sociology or anthropology. Open to doctoral candidates only.

SOC 3620, SOC 3621, SOC 3622 Doctoral Proseminar

1 Q.H. each

This course is required of all doctoral candidates and is designed to help socialize them for participation

as professional sociologists and anthropologists. Topics discussed include the nature of intellectualism and the functions of an intellectual in society today, the university as a structure and as a community of scholars, the nature of professional organizations, teaching sociology and anthropology, the organization of sociological and anthropological research, ethics in the profession, the nature of applied sociological and anthropological work. The course offers participants the opportunity to acquire practical experience in self-presentation and giving colloquia. *Prep.: SOC 3321 and SOC 3300 or SOC 3301 or SOC 3302 or consent of the instructor.*

SOC 3798 Master's Thesis Continuation 0 Q.H.

SOC 3799 Doctoral Dissertation Continuation

0 Q.H.

SOC 3800, SOC 3801, SOC 3802 Directed Study in Sociology Max.: 9 Q.H.

Reading and research under the direction of a faculty member. *Open to doctoral candidates only.*

SOC 3810 Master's Paper in Sociology 6 Q.H.

Empirical or library research meeting the criteria for publication in a professional journal. *Supervision by members of the department.*

SOC 3820 Doctoral Dissertation (No credit)

Biology

BIO 3509 Principles of Systematics 2 Q.H.

Presentation of theories and techniques employed in systematics; rules according to the International Codes of Zoological and Botanical Nomenclature.

BIO 3510 Environmental and Population

Biology 2 Q.H.

Physiochemical factors influencing and influenced by organisms. Interaction among individual organisms and among species. Students are expected to participate in lectures and laboratories given for BIO 1211. Individual work on specialized aspects of ecology is assigned. *Prep.: One year of general biology, including plant and animal biology. Open only to graduate students completing deficiencies in entrance requirements.*

BIO 3511 Aquatic Ecology 3 Q.H.

Chemical, physical, and biotic features influencing coastal, lake, and stream communities. Lectures. *Prep.: BIO 1211 or BIO 3510 or equivalent.*

BIO 3512 River Ecology Laboratory 3 Q.H.

Two four-hour sessions per week (combined lecture and lab). Chemical determinations, measurement of primary and secondary production, organismal identification in flowing waters of different types.

BIO 3517 Lake Ecology Laboratory 3 Q.H.

Two four-hour sessions per week (combined lecture and lab). Chemical determinations, measurement of primary and secondary production, organismal identification in lakes of different types.

BIO 3518 Ecology of Salt Marshes 3 Q.H.

Survey of fauna and flora, environmental factors affecting them, and current biological and social problems associated with salt marshes. This course will meet for two lectures of one and one-half hours each, and one full day of laboratory for six weeks during the summer quarter. *Prep.: BIO 1211 or BIO 3511 or equivalent.*

BIO 3519 Ecology of Rocky Shores 4 Q.H.

Examination of current ecological concepts regarding rocky intertidal and subtidal communities. The influence of biotic and abiotic factors on composition, distribution, and diversity of plant and animal species is emphasized.

BIO 3520 Environmental Microbiology 4 Q.H.

The microbial environment and ecology of the cell. Interactions between microbial populations, stressing soil and fresh-water associations. *Prep.: BIO 1320 or equivalent.*

BIO 3521 Food Microbiology 3 Q.H.

Microbiology of food with emphasis on pathogenic types and their interactions with other groups indigenous to food. Food fermentations, food processing, and environmental factors influencing growth and development of microorganisms in food. *Prep.: BIO 1320 or equivalent.*

BIO 3522 Food Microbiology Laboratory 2 Q.H.

Detection, quantification, and isolation of microorganisms and their products of significance in food with emphasis on the pathogenic types. *Prep.: BIO 3521 (may be taken concurrently).*

BIO 3527 Animal Virology 3 Q.H.

Physical and chemical properties of viruses, viral replication, genetics, cytopathology, and tumor viruses. Medical virology, including pathogenesis, clinical features, epidemiology, and immunization of the common viral diseases. *Prep.: BIO 1320 or equivalent.*

BIO 3528 Animal Virology Laboratory 2 Q.H.

Cultivation and identification of viruses. Use of animals, eggs, and animal cell cultures for viral assays. *Prep.: BIO 3527 (may be taken concurrently).*

BIO 3530 Plant Nutrition and Metabolism**4 Q.H.**

Mineral nutrition, photosynthesis, metabolic pathways, and translocation in higher plants.

BIO 3531 Plant Growth and Reproduction**4 Q.H.**

Plant hormones, growth, development, and physiology of reproduction. *Prep.: BIO 3530.*

BIO 3537 Marine Algae**4 Q.H.**

Systematics, life histories, and ecology of marine algae, with emphasis on the flora of the Gulf of Maine (Marine Science and Maritime Studies Center).

BIO 3538 Plant Morphogenesis**4 Q.H.**

The origin of form, experimentally controlled development, and external and internal factors that govern development of form. Plant tissue, organ, and cell culture techniques employed in the study of morphogenetic processes. *Prep.: BIO 1437.*

BIO 3547 Biomechanics I, Theory**4 Q.H.**

An introduction to engineering theory and techniques as applied to the disciplines of morphology, evolution, and ecology. Topics include material properties, structural elements and systems, and elementary fluid dynamics. Laboratory emphasizes biological materials in a mechanical sense, the physical biology of flow, and an examination of the fundamental principles of physical laws that affect living organisms. *Prep.: Permission of instructor.*

BIO 3548 Biomechanics II, Applications**4 Q.H.**

A forum for research in biomechanics in which students are expected to develop and execute a research project. In addition, current areas of

biomechanical research will be reviewed and evaluated. *Prep.: BIO 3547 and permission of instructor.*

BIO 3549 Physiology and Biomechanics of Animal Activity**3 Q.H.**

An integrated study of the physiological and biomechanical systems that support locomotory activity in animals. The first part is devoted to the structure and function of skeletal muscle and to respiratory and cardiovascular adaptations for activity. The remainder integrates physiological and biomechanical information related to flying, swimming, and terrestrial locomotion. *Prep.: General physiology.*

BIO 3550 Cardiovascular Physiology**3 Q.H.**

Physiology of blood cells, anemia, polycythemia immunity, and allergy. Electrophysiology of the heart, cardiac cycle, EKG, hemodynamics, capillary dynamics, pulmonary circulation, cardiovascular reflexes, cardiac output, and venous return. Cardiac failure, coronary circulation, atherosclerosis, hypertension, cerebral circulation, circulatory shock.

BIO 3551 Cardiovascular Physiology Laboratory**1 Q.H.**

Three hours of laboratory study per week. *Prep.: BIO 3550.*

BIO 3552 Osmotic and Ionic Regulation**2 Q.H.**

Comparative physiology of regulation and transport of water and the principle solutes in animals. Principles and underlying mechanisms will be discussed, as well as examples selected from a variety of phyla. *Prep.: Basic physiology.*

BIO 3557 Environmental Physiology**3 Q.H.**

Study of the mechanisms for short-term and chronic adaptation to changes in environmental conditions. Consideration of physiological responses to high altitudes, diving, thermal environment, space travel, and biological clocks. Endothermic vertebrates are emphasized. For students with background in physiology. *Prep.: Basic animal physiology or consent of instructor.*

BIO 3558 Vertebrate Endocrinology**3 Q.H.**

Principles of hormonal regulation of physiological processes in vertebrates, mechanisms of hormone action, neuroendocrine relationships.

BIO 3559 Animal Nutrition**2 Q.H.**

Detailed consideration of organic and inorganic nutritional requirements of humans and selected animals. Digestion, absorption, and metabolism of nutrient materials. Role of vitamins, minerals, and trace elements in metabolism. Variation in nutritional needs among normal individuals and in various physiological and genetic pathologies. Evaluation of food additives and of permissible levels of toxic materials in food. *Prep.: Basic biochemistry or consent of instructor.*

BIO 3560 Genetics and Developmental Biology**2 Q.H.**

Elaboration of the classic laws of heredity, including cytogenetics and chemical basis of heredity. Selected examples of the development of form and function. Students are expected to participate in lectures and laboratories given for BIO 1260 and are assigned extra individual work. *Prep.: General biology. Open only to graduate students completing deficiencies in entrance requirements.*

BIO 3561 Cell Physiology and Biochemistry**2 Q.H.**

Basic chemical and physical processes of cells related to their fine structure; oxidative and intermediary metabolism, photosynthesis, membrane phenomena; movement; chemical and physical processes of prokaryotic and eukaryotic cells. Students are expected to participate in lectures and laboratories given for BIO 1261. Extra, individual work is assigned. *Prep.: General biology, college physics, and organic chemistry. Only open to graduate students completing deficiencies in entrance requirements.*

BIO 3562 General Biochemistry**3 Q.H.**

A survey of the field of biochemistry with emphasis on protein structure, enzyme catalysis, bioenergetics, chemistry and metabolism of carbohydrates, lipids, amino acids, and nucleotides, and the synthesis and function of macromolecules in the context of organelle development. *Prep.: Permission of instructor. Required of all entering graduate students in biochemistry, cell physiology, and molecular biology. Students may be exempted by successfully completing the final examination from a previous year's course.*

BIO 3567 General Biochemistry Laboratory**3 Q.H.**

An intensive course intended to introduce the student to modern research technique used in biochemistry and molecular biology. Topics include purification and characterization of proteins, kinetic properties of enzymes, isolation of high molecular weight DNA, recombination of DNA molecules *in vitro*, isolation of bacterial clones containing recombinant molecules, and *in vitro* mutagenesis. The course includes two hours of lecture and six hours of laboratory, all in one day. Lectures will include a discussion of safety and moral concerns raised by uses of genetic engineering. Required of all entering graduate students in biochemistry, cell physiology, and molecular biology.

BIO 3568 Microbial Biochemistry**4 Q.H.**

Study of enzymatic reactions, including their mechanism and regulation, involved in pathways of energy metabolism and biosynthesis by microorganisms. The mechanism of action and research use of antibiotics are discussed. *Prep.: A term or more of biochemistry.*

BIO 3569 Microbial Genetics**3 Q.H.**

Principles and practical application of the genetics of microorganisms. Genetic exchange in bacteria mediated by bacteriophage and plasmids is emphasized. Several eukaryotic systems are also discussed. *Prep.: BIO 1320 or equivalent.*

BIO 3570 Lower Invertebrates**4 Q.H.**

Taxonomy, morphology, embryology, and life histories of acoelomate phyla (Marine Science and Maritime Studies Center).

BIO 3571 Coelomate Invertebrates**4 Q.H.**

Biology of annelids, arthropods, molluscs, and echinoderma (Marine Science and Maritime Studies Center).

BIO 3572 Biology of Meiofauna**2 Q.H.**

Systematics and ecology of marine interstitial fauna. *Prep.: Invertebrate zoology.*

BIO 3577 Malacology**4 Q.H.**

Functional morphology, embryology, systematics, and ecology of the major groups of molluscs. *Prep.: Invertebrate zoology.*

BIO 3601 Biological Electron Microscopy**4 Q.H.**

Techniques of electron microscopy applied to biological materials. Specimen preparation, fixation, thin-sectioning, staining, operation of electron microscope, photographic techniques, interpretation of electron micrographs. Student seminars and project required. *Prep.: Consent of the instructor.*

BIO 3607 Advanced Developmental Biology**3 Q.H.**

Study of current concepts of animal and plant development at the molecular and physiological levels. Among topics of discussion are nucleic acid and protein synthesis in development, metabolic activation at fertilization, regulation of the eukaryotic genome, control of cell differentiation, and molecular communication between cells. Reading and interpretation of the primary literature is stressed. Three hours of lecture per week.

BIO 3608 Advanced Developmental Biology Laboratory**2 Q.H.**

Analysis of the fundamental problems of development through experimental techniques. Culture of vertebrate and invertebrate embryos, microsurgical analysis of morphogenesis, biochemistry of development, cell-cell interactions, and organ and tissue culture are studied. Five hours of laboratory per week. *Prep.: BIO 3607 or consent of the instructor.*

BIO 3609 Cellular Aspects of Development**3 Q.H.**

Study of animal and plant development at the cellular level. Among discussion topics are cell-cell interaction, cell surface differentiation, differential cell adhesion, genetic and epigenetic

control or pattern formation, and ultrastructural aspects of fertilization and development. Reading and interpretation of the primary literature are stressed. Three hours of lecture per week.

BIO 3610 Human Ecology 4 Q.H.

Human tolerances for natural and unnatural environmental factors and man's activities affecting these factors. Man, food, and population dynamics.

BIO 3617 Environmental Law 2 Q.H.

The scientific information required for implementation of the legal and political aspects of environmental management. The role of the scientist as an expert witness. Scientific and legal predictability. Analyses of suitable dynamic models and case law with the goal of improving the results of legal, political, and scientific decisions bearing upon remedial environmental management. *Prep.: Biology core and first course in physiology, e.g., BIO 1258 and BIO 1259.*

BIO 3620 Industrial Microbiology 3 Q.H.

Microorganisms and methods employed in production of products of economic and medical importance, decomposition of wastes, and control of desirable and unwanted processes and biodegradation. Fermentation processes emphasized. *Prep.: BIO 1420 or equivalent, or consent of instructor.*

BIO 3621 Industrial Microbiology Laboratory 2 Q.H.

Laboratory and discussion seminar sessions devoted to the study of selected commercial processes.

BIO 3650 Experimental Mammalian Physiology 4 Q.H.

Experimental study of the circulatory, respiratory, digestive, excretory, reproductive, nervous, and endocrine systems in mammals, with emphasis on laboratory procedures and surgical techniques used with living animals—primarily the rat. *Prep.: Background in physiology, consent of the instructor.*

BIO 3651 The Gastrointestinal Tract 3 Q.H.

Study of structure, function, and, where appropriate, the pathology of the gastrointestinal tract. Historical overview of the structure of all areas of the tract, including the liver and gallbladder, is followed by a functional analysis covering secretion, absorption, and bile formation and release. *Prep.: Basic animal physiology or consent of instructor.*

BIO 3652 Comparative Neurobiology 3 Q.H.

A cellular approach to structure and function of the nervous system. Topics to be covered include neuronal anatomy, cellular properties of single neurons, synaptic transmission, integration in nerve cells, nerve networks, sensory systems, motor systems, sensory-motor integration, specification of neuronal connectivity, and phylogeny

of nervous systems. *Prep.: General (animal) physiology.*

BIO 3657 Neurophysiology Laboratory 2 Q.H.

Introduction to neurophysiological methods. *Prep.: BIO 3652 (may be taken concurrently).*

BIO 3658 Nervous Control of Homeostatic Functions 3 Q.H.

Discussion of the nervous control of ventilation, heart and vascular system, water and salt intake, feeding and body weight, energy metabolism, arousal, pain mechanism, and factors affecting autonomic function. Emphasis on higher vertebrates. *Prep.: Basic animal physiology.*

BIO 3659 Renal Physiology 2 Q.H.

An in-depth study of the mammalian kidney. Examination encompasses structure and its relationship to function. Functional aspects are related to the mechanisms of ionic balance, water balance, and acid-base balance necessary for the maintenance of the total organism. Effects of hormones on the kidney and kidney hormones on the total organism are also covered. *Prep.: Physiology, cell biology, or permission of instructor.*

BIO 3660 Cell Biophysics and Biochemistry 5 Q.H.

Biogenesis and ultrastructure of the cell considered along with biophysical procedures and biochemical patterns used in the study of cellular and tissue components. Lecture only. *Prep.: Organic chemistry, general biology, biochemistry, and cell biology.*

BIO 3661 Human Genetics 3 Q.H.

Application of basic genetic principles to the study of variability in humans. Course focuses primarily on cytogenetics, biochemical genetics, monogenic, and multifactorial inheritance and population genetics. Topics of special interest include sex determination and differentiation, early embryology, twinning, birth-defect etiology, prenatal diagnosis, and genetic counseling. *Prep.: BIO 1260 or equivalent.*

BIO 3667 Biochemistry Laboratory Rotation I 3 Q.H.

Experience is gained in biochemical research by spending six weeks in each of two laboratories during the winter quarter. Required of all first-year graduate students in biochemistry, cell physiology, and molecular biology.

BIO 3668 Biochemistry Laboratory Rotation II 3 Q.H.

A continuation of BIO 3667 during the spring quarter.

BIO 3669 Biochemistry Laboratory Rotation III 3 Q.H.

A continuation of BIO 3668 during the summer quarter intended for students who have not yet chosen a laboratory in which to carry out thesis work. Not recommended except where necessary.

BIO 3670 Developmental Biology of Marine Invertebrates**5 Q.H.**

Descriptive and experimental studies of embryonic and larval development of marine invertebrates. Laboratory work includes observation and experimentation using live material from a broad spectrum of invertebrate phyla (Marine Science and Maritime Studies Center).

BIO 3671 General Helminthology**3 Q.H.**

Morphology, life histories, and biology of helminths parasitic in animals.

BIO 3672 Ichthyology**4 Q.H.**

Natural history and systematics of fishes, with emphasis on marine species (Marine Science and Maritime Studies Center). *Prep.: Comparative anatomy or vertebrate zoology.*

BIO 3690 Seminar**1 Q.H.**

Various topics and recent developments in botany, biochemistry, microbiology, molecular biology, physiology, and zoology are covered in depth. Student presentations are emphasized. To facilitate the planning of assignments, students are urged to contact the instructor during the quarter before the seminar is to be offered.

BIO 3691 Special Topics in Biology**(credit variable)**

Special study of a selected topic under direction of a faculty member, preliminary to submission and approval of M.S. thesis proposal or M.S. literature dissertation proposal. Topic and direction of study to be arranged with the faculty member supervising the study. *Credits convertible to M.S. thesis or M.S. dissertation.*

BIO 3692 Special Investigations in Biology**(credit variable)**

Studies of a topic not directly related to research being pursued for a thesis or dissertation. May take the form of a special course.

BIO 3697 M.S. Thesis**(credit variable)**

Research methods of some special field and their application to a specific problem, under direction of a graduate faculty member.

BIO 3698 M.S. Literature Dissertation**(credit variable)**

An extensive literature research under the direction of a graduate faculty member leading to a

comprehensive written review of a significant biological problem and an oral examination.

BIO 3699 Ph.D. Dissertation

Original research in depth, representing a significant contribution of new biological knowledge, and a written dissertation thereon, under the supervision of a graduate faculty member.

BIO 3798 Master's Thesis Continuation**0 Q.H.****BIO 3799 Doctoral Dissertation Continuation****0 Q.H.****INT 3101 Biochemistry I****2 Q.H.**

Description of the components of biochemistry, including the chemistry of carbohydrates, lipids, prostaglandins, steroid hormones, amino acids, polypeptides, proteins, purines, pyrimidines, nucleosides, and nucleic acids. Consideration of Henderson-Hasselbalch expression, buffers, and importance of pKa. *Prep.: two quarters of organic chemistry.*

INT 3102 Biochemistry II**2 Q.H.**

Discussion of enzymes, enzyme kinetics, and mechanisms of enzyme reactions. An introduction to the methods used to study intermediary metabolism, bioenergetics, biological oxidation reduction reactions, and the electron transport chain. A consideration is made of carbohydrate metabolism, including the citric acid cycle, the Embden-Meyerhoff pathway, and the pentose phosphate pathway. Use of isotopes in biochemistry and the role of high-energy phosphate compounds are outlined. *Prep.: INT 3101.*

INT 3103 Biochemistry III**2 Q.H.**

Lipid metabolism is presented, including the fatty acid cycle, biosynthesis of fatty acids, and biological formation of prostaglandins, cholesterol, and steroid hormones. The metabolism of various amino acids is considered, including the urea cycle, one-carbon fragments, transamination reactions and aromatic hydroxylations. Metabolism of nucleic acids and their building blocks are discussed, as well as the genetic basis of protein synthesis, genetic code, and mechanisms of control. *Prep.: INT 3102.*

Chemistry

All courses carry two quarter-hours of credit unless otherwise specified.

CHM 3401, CHM 3402, CHM 3403 Special Topics in Chemistry: Chemistry and Society I, II, III

Special topics of current importance, including chemical aspects of the environment: pollution and its determination, pesticides, carcinogenics,

resources; chemical aspects of energy conversion and storage: fossil fuels and fuel analysis; nuclear reactors; storage batteries; hydrogen production and storage; solar energy, photovoltaic cells and photochemistry; energy-related materials. *Prep.: Bachelor's degree in science or engineering.*

CHM 3420 Modern Methods of Analysis 2 Q.H.
Similar to CHM 3430, but without laboratory.
Prep.: Consent of instructor.

CHM 3430 Modern Methods of Analysis 3 Q.H.
Training in a wide variety of modern methods of instrumental analysis with extensive "hands-on" experience offered by a laboratory section. Areas covered include data handling; spectroscopy (UV-visible and IR absorption, luminescence, X-ray, atomic absorption and mass spectrometry), separations (gas and modern liquid chromatography, TLC); pulse polarography; X-ray diffraction; microscopy (optical and scanning electron microscopy, including X-ray fluorescence microscopy), computerized instrumentation. (Restricted to students in the Forensic Chemistry M.S. program, except by special arrangement.)

CHM 3501 Polymer Chemistry I
Introduction to polymers. Major emphasis on synthesis. Step-reaction, chain-reaction, and ring-opening polymerizations. Copolymerization. Three-dimensional polymers and crosslinking.
Prep.: One year of organic chemistry and one year of physical chemistry.

CHM 3502 Polymer Chemistry II
Physical chemistry of polymers in solution and bulk. Molecular characterization. Mechanical and physical properties in the glassy, rubbery, viscous, and semicrystalline states. *Prep.: CHM 3501.*

CHM 3503 Polymer Chemistry III
Industrial practice, polymer processing, fibers, elastomers, coatings, adhesives, and reinforced plastics. Relationship of polymer structure to usage. *Prep.: CHM 3502.*

CHM 3510 Special Projects in Chemistry
Laboratory studies on a topic not directly related to research pursued for a thesis. *Prep.: Permission of the departmental faculty is required.*

CHM 3521 Analytical Separations
Theory and practice of analytical separation techniques. Emphasis is on fundamentals as they relate to practice. Topics for examination are based mainly on chromatographic processes including gas and high speed liquid chromatography. Other topics include zone refining, liquid-liquid extraction, and electrophoresis

CHM 3522 Advanced Analytical Separations
Continuation of CHM 3521. *Prep.: CHM 3521.*

CHM 3523 Electroanalytical Chemistry I
The theory, applications, and instrumentation for potentiometry, pH, ion selective electrodes, conductancy, and high-frequency measurements. The techniques of direct measurement, titration end-point detection, and on-line measurements.

CHM 3524 Electroanalytical Chemistry II
The theory, applications, and instrumentation for electrogravimetry, polarography, voltammetry,

chronopotentiometry, and coulometric titration. Techniques for direct measurement, titration end-point detection, and on-line measurements. *Prep.: CHM 3523.*

CHM 3525 Optical Methods of Analysis I
Theory and practice of absorption spectrometric methods of analysis. Optics and basic instrumental considerations.

CHM 3526 Optical Methods of Analysis II
Emission and fluorescence methods of analysis; including atomic techniques, X-ray fluorescence, and Raman spectrometry. *Prep.: CHM 3525.*

CHM 3528 Computers In Chemistry 3 Q.H.
A laboratory-lecture course illustrating the use of small digital computers for real-time control of chemical instruments. Topics include digital logic, real-time data structures, A/D and D/A conversion; noise and other aspects of real-time computer interfacing. Programming is done on a PDP-11 computer in MIRACL, a language designed for real-time processing. *Prep.: Consent of instructor.*

CHM 3531, CHM 3532, CHM 3527 Special Topics in Analytical Chemistry I, II, III
Selected topics of current importance in analytical chemistry. *Prep.: Consent of instructor.*

CHM 3541 Advanced Inorganic Chemistry I
Application of basic quantum chemistry to inorganic systems. Russell-Saunders and j-j coupling. Stereochemistry of nontransition-metal compounds, bonding and structure of electron-deficient systems.

CHM 3542 Advanced Inorganic Chemistry II
Magnetic properties; electronic spectra and selection rules. Thermodynamic stability of coordination compounds. Experimental techniques of inorganic chemistry. *Prep.: CHM 3541.*

CHM 3543 Advanced Inorganic Chemistry III
Crystal symmetry. Introduction to theory of loids; semi-conductors and metals; non-stoichiometric compounds; solid-state reactions. Application of molecular orbital theory. Determination of electron distribution in transition metal compounds. Mossbauer spectroscopy and advanced magnetochemistry. *Prep.: CHM 3542 and CHM 3591.*

CHM 3561, CHM 3562 Advanced Organic Chemistry I, II
An intensive survey of organic reactions. Modern concepts of structure and mechanism are used to correlate factual material. *Prep.: One year of organic chemistry.*

CHM 3563 Physical Organic Chemistry
Topics in basic physical organic chemistry: molecular polarity, equilibrium and kinetics, reactivity and structure, solvent effects, acid-base catalysis, orbital symmetry, aromaticity. *Prep.: CHM 3562 or consent of instructor.*

CHM 3564 Spectrometric Identification of Organic Compounds

Interpretation of the ultraviolet, infrared, and nuclear magnetic resonance spectra of organic compounds. *Prep.: One year of organic chemistry.*

CHM 3581 Chemical Thermodynamics I

First Law of Thermodynamics, Thermochemistry Second and Third Laws, free energies, reaction end phase equilibria. *Prep.: Consent of instructor.*

CHM 3582 Chemical Thermodynamics II

Partial molar properties, solutions, electrolytes. Statistical analogues of entropy and free energy, partition functions. *Prep.: CHM 3581.*

CHM 3583 Chemical Thermodynamics III

Statistical thermodynamics applied to gases, liquids, and solids. Irreversible thermodynamics. *Prep.: CHM 3582 and CHM 3592.*

CHM 3591 Introductory Quantum Chemistry I

Introduction to quantum mechanics. Application to simple systems. Perturbation theory and applications. Harmonic oscillator, rigid rotor and applications to microwave and infrared spectroscopy. Simple atoms. *Prep.: One year of physical chemistry.*

CHM 3592 Introductory Quantum Chemistry II

The variational method. The chemical bond $H + 2$. The LCAO method. Group theory and applications. Molecules. Woodward-Hoffman rules. *Prep.: CHM 3591.*

CHM 3593 Introductory Quantum Chemistry III

Application of group theory and simple approximate theories to conjugated molecules. The SCF method and its application to atoms and molecules. Applications to molecular spectroscopy. *Prep.: CHM 3592.*

CHM 3594 Chemical Kinetics

Use of experimental data to deduce the rate law of a reaction. Mechanisms deduced from rate laws. Influence of experimental error on precision of rate constants and activation energies. Collision- and transition-state theories of reaction rates. *Prep.: One year of physical chemistry.*

CHM 3641 Coordination Chemistry

Solution phase properties of coordination compounds. Experimental methods for the study of thermodynamics stability and kinetic lability. Kinetics and mechanism of solvent exchange and substitution reactions at transition metal centers. Classification of redox reaction mechanisms. Marcus theory. Phenomenological mechanisms. *Prep.: CHM 3543.*

CHM 3642, CHM 3643, CHM 3644, CHM 3645 Special Topics in Inorganic Chemistry I, II, III, IV

Advanced topics of importance in inorganic chemistry including advanced ligand field theory: crys-

tal field theory of ions in weak and strong fields. Molecular orbital theory of transition metal complexes. Crystal structure determination in solids: crystallography, X-ray, electron and neutron diffraction techniques applied to inorganic, bio-inorganic and other solids. Resonance spectroscopy in inorganic chemistry, including electron spin, nuclear magnetic, and nuclear quadrupole resonance; and Mossbauer spectroscopy. Solid-state chemistry: thermal, magnetic and transport properties; phase transformations and crystal defects; surface effects, material preparation techniques. *Prep.: CHM 3542 and consent of instructor.*

CHM 3661, CHM 3662 Organic Stereochemistry and Reaction Mechanisms I, II

Interrelations of the stereochemistry of organic molecules with their physical and chemical behavior. Conformational analysis. The effects of spatial relationships on transition states, equilibria, and reaction rates as an introduction to the study of organic reaction mechanisms. *Prep.: CHM 3563.*

CHM 3663, CHM 3664 Organic Reaction Mechanisms and Organic Synthesis I, II

The fundamental factors influencing the courses of organic reactions. Substitution reactions. Pericyclic reactions. Synthetic methods as an introduction to organic synthesis. *Prep.: CHM 3662 or concurrent registration therein.*

CHM 3671, CHM 3672, CHM 3673 Special Topics in Organic Chemistry I, II, III

Selected topics of current importance in organic chemistry. *Prep.: CHM 3562 and consent of instructor.*

CHM 3681, CHM 3682, CHM 3683 Special Topics in Physical Chemistry I, II, III

Advanced topics of importance in physical chemistry including quantum chemistry: linear algebra and the formulation of quantum theory. Angular momentum. Group theory. Small molecules. Time-dependent theory and selected advanced topics. Statistical mechanics. Quantum statistics; electrons in metals, photons, and phonons; superconductivity; fluctuations, noise, and irreversible thermodynamics; transport phenomena; phase transitions of high order. *Prep.: Consent of instructor.*

CHM 3800, 3801, 3802, 3803 Seminar 1 Q.H.

Oral reports by the participants on current investigations in chemistry. *Prep.: Enrollment in full-time program.*

CHM 3810 Research for M.S.

(Maximum: 14 Q.H.)

Original research and a written thesis thereon, under supervision of a faculty member.

CHM 3820 Research and Dissertation for Ph.D.

Original research in depth, representing a significant contribution of new chemical knowledge, and a written dissertation thereon, under the supervision of a faculty member. *Prep.: Doctoral candidacy.*

INT 3101 Biochemistry I

Discussion of the structures and chemistries of carbohydrates, proteins, lipids, nucleic acids, and selected cofactors. *Prep.: One year organic chemistry.*

INT 3102 Biochemistry II**2 Q.H.**

Discussion of enzymes, enzyme kinetics, and mechanisms of enzyme reactions, of intermediary metabolism and of bioenergetics, biological oxidation-reduction reactions and the electron transport chain. A consideration is made of carbohydrate metabolism including the glycolytic pathway, the citric acid cycle and the pentose phosphate pathway. *Prep.: INT 3101. Offered summer and winter quarters.*

INT 3103 Biochemistry III

Continuation or intermediary metabolism from Biochemistry II, including lipid, protein, and nucleic acid metabolism, photosynthesis, and cell regulation. *Prep.: Biochemistry II, INT 3102.*

Economics

All courses carry three quarter-hours of credit unless otherwise specified. Courses indicating macroeconomics theory as a prerequisite refer to ECN 3120 (for M.S. degree students) and ECN 3220 (for M.A. degree students).

ECN 3010 Introduction to Intermediate Microeconomic Theory

Intensive coverage of basic micro theory. This course is designed for M.A. degree students who need to improve their background in micro theory and carries no academic credit toward the M.A. or Ph.D. programs.

ECN 3020 Introduction to Intermediate Macroeconomic Theory

Intensive coverage of basic macro theory. This course is designed for M.A. degree students who need to improve their background in macro theory and carries no academic credit toward the M.A. or Ph.D. programs.

ECN 3030 Introduction to Mathematics for Economists**0 Q.H.**

This course helps acquaint students with matrix algebra and elementary calculus necessary for quantitative economics: simultaneous linear systems; polynomial, logarithmic, and exponential functions; and elementary differential and integral calculus. *This course offers no credit toward a degree in economics.*

ECN 3040 Introduction to Statistics**0 Q.H.**

An introduction to statistical methods and techniques used in economic analysis. Descriptive statistics, time-series and index number problems, sampling problems, introduction to probability theory, and hypothesis testing. This course is designed for M.A. degree students who need to improve their background in basic statistics and carries no academic credit toward the M.A. or Ph.D. programs.

ECN 3110 Introduction to Intermediate Microeconomic Theory

Intensive coverage of basic micro theory. This course is designed for M.A. degree students who need to improve their background in micro theory and carries no academic credit toward the M.A. or Ph.D. programs.

ECN 3120 Introduction to Intermediate Macroeconomic Theory

National income definitions and measurements, Keynesian models, multipliers, growth models, investment, consumption and monetary theories. *(4 cr. for MSEPP)*

ECN 3130 Introduction to Mathematics for Economists

Seeks to acquaint the student with the algebra and elementary calculus necessary for quantitative economics: simultaneous linear systems; polynomial, logarithmic, and exponential functions; and elementary differential and integral calculus. *(3 cr. for MSEPP)*

ECN 3140 Introduction to Statistics

An introduction to statistical methods and techniques used in economic analysis. Descriptive statistics, time-series and index number problems, sampling problems, introduction to probability theory, and hypothesis testing. *(4 cr. for MSEPP)*

ECN 3150 Microeconomic Policy Planning Seminar**4 Q.H.**

Cost efficiency and effectiveness, assessment of externalities, shadow prices, benefit-cost analysis, project implementation and evaluation, budget

analysis, evaluation of public programs, role of private and public sectors, relationship of projects and macro planning, use of analysis by policymakers. *Prep.: ECN 3110, ECN 3140 co-requisite.*

ECN 3151 Macroeconomic Policy Planning Seminar

4 Q.H.

Role of public sector in the economy. Socio-economic objectives and public policies. National economic planning and synthesis of models for growth and development. Tools and techniques for economic planning. Construction and utilization of input-output tables. Planning and policy implementation and evaluation. *Prep.: ECN 3120, ECN 3140 co-requisite.*

ECN 3152 Workshop In Economic Planning and Policy

Empirical work involving micro and macro planning techniques, applying the latter to individual case studies of a specific plan, program, or organization. Students are expected to prepare and present a research paper on a chosen case study, demonstrating the ability to use planning techniques. *Prep.: ECN 3150 and ECN 3151.*

ECN 3210 Microeconomic Theory I

4 Q.H.

A non-math treatment of microeconomic theory at the beginning graduate level. An investigation of the conditions underlying consumer and producer equilibrium under different objective functions and various market structures. Derivation of product demand curves, supply curves, and factor demand curves for alternative market structures in product and factor markets are surveyed.

ECN 3220 Macroeconomic Theory I

4 Q.H.

Income and employment theory; classical Keynesian, and post-Keynesian aggregate demand and supply systems.

ECN 3240 Statistical Inference

4 Q.H.

A study of statistical methods and techniques. Probability theory and models, testing economic hypotheses, analysis of variance, ordinary least-squares regression, t-statistics and f-statistics. Correlation analysis. *Prep.: ECN 3040 or statistics examination.*

ECN 3241 Econometrics I

4 Q.H.

Estimation of demand, supply, cost, and production functions; applications of multivariate analysis of economic data; identification; determination of trend, oscillation, and periodic movements; autocorrelation and correlogram analysis, trends in multiple regressions.

ECN 3310 Case Studies in Applied Microeconomics

Topics in applied microeconomics. Case studies on organizational decision making for such problems as short-run and long-run forecasting of demand, price policy, financing of investments, location of plants, and response to government regulations and taxation. *Prep.: ECN 3010 or ECN 3110.*

ECN 3330 Economic Programming

Economic programming with emphasis on linear programming, simulation and queuing theory with applications to the computer. *Prep.: ECN 3530.*

ECN 3331 Accounting for Economists

An overview of private and public sector accounting systems and techniques to assist students in developing the ability to use these techniques in obtaining data and analyzing problems. Topics covered include national income accounts, balance-of-payment accounts, the private firm's balance sheet, income statement and flow-of-funds statement. Other issues, such as real vs. nominal magnitudes and depreciation techniques, are also covered.

ECN 3350 Economics of the Labor Market and Labor Force I

Labor force measurement and determinants, women's changing role in the labor market; micro-analysis of labor supply and demand, varieties of labor markets and their functioning, minimum wages; wage structures and differentials, labor allocation and migration; union impact on wage levels and structures; macro-wage-employment determination, macro-wage-price problems, income policies. Applications to developing and developed economies.

ECN 3351 Economics of the Labor Market and Labor Force II

Unemployment and underemployment, technological change and changing skill requirements; income distribution and poverty; human capital theories and human resource development; employment and training policies to raise personal earnings, income maintenance programs. Topics discussed in relation to developing and developed economies.

ECN 3352 Economics of Manpower Planning I

The role of manpower planning and its integration with general development planning. Analysis and evaluation of different techniques of manpower planning. Technological versus economic methods. Practice of manpower forecasting and data problems. Skill training versus educational strategies. Models of educational planning and their applications to different countries. *Prep.: Microeconomic theory.*

ECN 3353 Economics of Manpower Planning II

Applications of manpower planning methods and techniques to problems of national economic development. Cost-benefit and cost-effectiveness of educational and manpower programs. Special problems of health manpower, scientists, engineers, and technicians. Evaluation of methods and prediction used in national manpower plans. *Prep.: ECN 3352.*

ECN 3354 Economics of Medical Care and Health Manpower

The organization of medical care, the problems associated with various alternative delivery systems. The utilization and availability of physicians and other paramedical personnel, the growth and pressures exerted by third-party payers; and consideration of federal, state, and municipal participation in the delivery of quality medical care under various alternatives for national health insurance.

ECN 3355 Economics of Education

An examination of the contribution of education to the process of economic growth and the way education is produced and distributed. Special topics include inequalities in returns to education; the role of intelligence and class background in educational success; and socializing role of education in production.

ECN 3356 Local Labor Markets: Research Methods and Problems

Analytical framework and empirical measures for determining the nature and operation of state and local labor markets. Varieties of local labor markets; use of data from public agencies to examine such markets; composition of local labor force, sources of local labor supply, industrial and occupational mix, local wage and salary structures, local income distribution.

ECN 3357 Human Resources Planning at State and Local Areas

Applied workshop in methods and techniques for planning human resource programs at state and local levels. Economic tools for state employment services, prime sponsors, and other service deliverers for designing, implementing, monitoring, and evaluating employment and training programs. Use of statistical packages in human resources planning.

ECN 3358 Economics of Education and Training Programs

Economic analysis of the relative effectiveness of different education and training programs at the state and local level. Implications of human capital theory; methods for coordinating alternative programs and determining their effectiveness. Rates of return, cost-effectiveness, cost-benefit. Applications to policy and program planning.

ECN 3359 Seminar in Human Resource Development

Selected topics on the development and use of human resources. *Prep.: Consent of instructor.*

ECN 3360 Regional Economics

Delineating regions. Theories of location for firms, industries, and people. Regional income accounting systems and models of intra- and interregional income determinants and impact analysis. *Prep.: Microeconomic theory.*

ECN 3361 Externalities

Theoretical foundations for urban and regional economics. Survey of economic theory related to externalities and welfare economics. *Prep.: ECN 3210 and consent of instructor.*

ECN 3362 Economics of Crime

A discussion of the resource allocation problem as it relates to criminal behavior and effective law enforcement. Evaluation of costs and benefits of alternative law enforcement policies. Criminal activity, including organized crime, is analyzed in an economic context.

ECN 3363 Urban Economic Systems

The economy of cities. Analysis of intrametropolitan spatial relationships including residential location, land, and housing markets. *Prep.: Microeconomic theory.*

ECN 3364 Urban Economic Development

Continuation of Urban Economic Systems. Problems in urban economics including segregation, housing, transportation, urban renewal, and related policy issues. *Prep.: ECN 3363.*

ECN 3365 Economics of Urban Transportation

Urban agglomeration, economic activities, residential concentration, and transportation network; urban and suburban densities in relation to the central place, capital budgeting; pricing; costs incidence and externalities of various modes; cost-benefit analysis; effects of transportation patterns on urban socioeconomic life; modal split and forecasting economic requirements for integrated urban transport needs.

ECN 3366 Economics of Intercity Transportation

Investigates the rationale for intercity freight and passenger movements within the framework of interregional commodity flows. The choice of mode once traffic volume has been determined. Study also covers the economic and environmental impacts of the choice of mode.

ECN 3369 Urban/Regional Economics Seminar

Selected topics in urban/regional economics. *Prep.: Consent of instructor.*

ECN 3370 Economic Development

A study of the prospects of economic growth in less developed areas. Measurement and theories of economic development. Role of human and natural resources, education, technology, and capital formation in national, regional, and sectoral development. Changes in institutions.

ECN 3371 Regional Development

Methodology and application of techniques for planning in multiregional systems. Empirical examples.

ECN 3372 Comparative Economic Development

Case studies of less developed countries at differing stages of economic development.

ECN 3373 Development Finance and Trade

Sources of investment finance in developing countries; role of taxation and tax structure reform; development of financial institutions and capital markets; private and official finance from abroad and debt-service problems; problems of monetary management and export instability.

ECN 3379 Development Planning Seminar

Political and economic plans. Survey of neoclassical growth models. Input-output techniques in open and closed models. Elements of linear programming; optimal decision techniques. Processes of implementation of planning; interaction of public and private sectors. Guide to empirical applications. *Prep.: ECN 3120 or ECN 3220 and ECN 3370 or consent of instructor.*

ECN 3380 Monetary Theory

A study of the relationships between money and economic activity with emphasis upon various quantity theory models and theories of the demand for money and velocity. *Prep.: Macroeconomic theory.*

ECN 3381 Monetary Policy

A study of the interrelationships between aggregate economic activity, financial markets, and central banking instruments, objectives, and policy.

ECN 3382 Public Policy and Finance

Techniques of fiscal policy, fiscal policy norms, public sector debt; tax policy; federal tax reform; the conflict between social implications of price stabilization and full employment; public expenditure policy and the interrelationship between monetary and fiscal controls. *Prep.: Macroeconomic theory.*

ECN 3383 Intergovernmental Fiscal Relations

A study of the development of the federal system, interstate and interarea fiscal comparisons, grants-in-aid, tax credits, revenue sharing, state and local taxes, nontax revenues, borrowing and budgeting at the state and local level, and a discussion of the process and prospects of state and municipal equalization of tax burden and efforts. *Prep.: Microeconomic theory.*

ECN 3384 Capital Markets

Primary sources of savings and demand for financial assets; role of financial intermediaries; banking system and government lending agencies. Demand for funds and real investment—mortgage, corporate, and government securities markets; interdependence of rate structures. Flow-of-funds data in relation to national income accounts.

ECN 3389 Money, Credit, and Banking Seminar

Selected topics in the economics of money, credit and banking. *Prep.: Consent of instructor.*

ECN 3510 Microeconomic Theory II 4 Q.H.

Theory and problems of macro-dynamics, growth, inflation cycles, and stabilization policy. *Prep.: ECN 3220 and consent of instructor.*

ECN 3511 Economics and the Law 1 Q.H.

Topics in the application of microeconomic principles to the law, such as property rights, torts, contract law, and the regulation of business. *Limited to Law, Policy, and Society students.*

ECN 3520 Macroeconomic Theory II 4 Q.H.

Theory and problems of macro-dynamics, growth, inflation, cycles, and stabilization policy. *Prep.: ECN 3220 and consent of instructor.*

ECN 3530 Mathematics for Economics 4 Q.H.

Application of matrix algebra and simple multivariate calculus to economic analysis. Static organization and dynamic analysis; difference and differential equations. Examples from economic theory. *Prep.: ECN 3030 or mathematics examination.*

ECN 3540 Econometrics II 4 Q.H.

Asymptotic and small sample properties of various estimators; rank-order conditions for identification; specification error and error in variables; remedies for autocorrelation and multicollinearity; dummy variables; distributed lags; forecasting and simulation; non-linear estimation; alternative estimation technique (two-stage least squares, three-stage least squares, maximum likelihood estimators, etc.) *Prep.: ECN 3241.*

ECN 3601 Doctoral Research Seminar I 4 Q.H.

Prep.: 12 q.h. of field work and consent of instructor.

ECN 3602 Doctoral Research Seminar II

4 Q.H.

Prep.: ECN 3601.

ECN 3798 Master's Thesis Continuation 0 Q.H.**ECN 3799 Doctoral Dissertation Continuation 0 Q.H.****ECN 3890 Master's Thesis Seminar**

(maximum 6 Q.H.)

Thesis supervision by members of the department; approval of graduate adviser required.

ECN 3895 Readings in Economics

(up to 3 Q.H.)

Supervised reading in selected topics in economics. *Prep.: Consent of instructor and approval of graduate adviser.*

ECN 3899 Doctoral Dissertation Seminar

(no credit)

Prep.: Approval of graduate adviser required.

English

All courses carry three quarter-hours of credit unless otherwise specified.

ENG 3300 Introduction to Literary Study

Materials and techniques of research. Writing a research paper. Approaches to literary study with consideration of both traditional and contemporary views.

ENG 3311 English Prose Style

The development of prose style in English (chiefly expository), from the sixteenth century to the present. Most major authors are represented, from Roger Ascham to James Baldwin.

ENG 3312 Theory and Teaching of Writing

Designed for teachers or prospective teachers of writing in college or the public schools, this course examines several premises of writing instruction and how they can provide successful classroom practices.

ENG 3315 Theories of Criticism

An introduction to the study of modern and contemporary literary theory and criticism: "New Critical," Marxist, psychoanalytic, structuralist, poststructuralist, phenomenological, and others.

ENG 3316 Critical Schools

A seminar concentrating on one or several related recent developments in literary theory and criticism such as structuralism or poststructural criticism. The subject of the seminar changes from year to year.

ENG 3321 Linguistics and Literary Study

Language viewed in its special function as literary medium. Linguistic approach to style, metaphor, form, and meaning. Representative works of major writers, poetry and prose, studied for characteristic formal properties. Discussion of contribution of linguistic analysis to literary criticism and to a theory of literature.

ENG 3322 Linguistics and the Art of Writing

Aspects of linguistics related to written forms of communication. Both fictional and nonfictional prose are represented. Topics in discourse analysis, textual cohesion, point of view and its effect on syntactic options, syntactic symbolism where syntax replicates meaning. Such problems as language and deception, speech and judgment, rhetoric and persuasion are also considered.

ENG 3323 Theatrical Styles

An examination of modern dramatic expression and theory with particular attention to absurdist drama, existentialist drama, and Brecht's theatre of alienation.

ENG 3324 Perspectives on American Literature

An attempt to discover common themes and recurrent patterns in American literature through a close reading of critics as various in their approach as Lawrence, Parrington, Chase, Pearce, and Fiedler.

ENG 3348 Research Materials and Methods for Technical Writing

This course will examine research sources in science, technology, and various professions. Such sources include computer searches, on-line data, corporate holdings, and specialized publications in engineering, computer science, the sciences, medicine, and business. Examples are the *IEEE Transactions*, the *New England Journal of Medicine*, U.S. Government publications, and the like. (An annotated list of technical reference guides appears in Houp and Pearsall's *Reporting Technical Information*.)

The course will also explore interviewing experts and using nonprint media as resources in science, technology, and business.

In addition to sources of scientific and technical information, publications in the areas of technical and business communication will be considered. These include the *ITCC Proceedings*, *Technical Communication*, and others, including bibliographies in the area.

In addition, the course will examine style guides particular to branches of technical and scientific writing. These include U.S. Government *Style Manual* (1983), military documentation specifications, the *Chicago Manual of Style*, and various corporate style guides (Digital Equipment Corporation, IBM, General Electric, and others).

ENG 3349 Workshop in Writing for Publication

This course will examine published articles in scientific, technical, and professional journals and magazines. The articles will be evaluated for content, style, tone, format, and mechanical details. Students will evaluate the article's success, its professionalism, its appropriateness and timeliness, and the professional standards of the journal.

Concurrently, students will research, write, and revise an article for submission to a professional journal of their choice. Members of the class will review and edit these articles before submission. The goal of the course is to have an article accepted for publication.

Technical editing approaches will be included in the course as they are appropriate.

Throughout the quarter, area authors whose articles appear in scientific and technical journals will be asked to present guest lectures, discussing both their field of expertise and their writing efforts. We may be able to call on Alan Leitman, whose column appears in *Science* 83, Tracy Kidder, author of *Soul of a New Machine* and contributor to *OMNI*, and various contributors to area publications such as *Computerworld* and the *New England Journal of Medicine*.

ENG 3350 Creative Writing I Prose fiction.

ENG 3351 Creative Writing II

Poetry.

ENG 3352 Writing for the Professions

This course examines the various forms of business communications and offers practical experience in writing business letters, memoranda, case studies, proposals, and reports. For students in the Graduate School of Business Administration.

ENG 3353 Problems in Writing

This course examines writing problems in general as well as those which are specific to professional interests.

ENG 3354 Technical Writing

Technical writing assignments, including correspondence, description, instructions, proposals, and reports. Use of graphics, layout techniques, and visual aids. Emphasizes audience definition, editing, and rewriting.

ENG 3355 Topics in Technical Writing

Writing assignments related to computers and the computer industry. Preparation of operator's manual and program documentation (instructions for running a program in a programming language such as BASIC or PASCAL). Course offers experience in editing and revision and work with graphics and layout in preparing assignments.

ENG 3358 Topics in Nonfiction Prose

This course will examine writings in nonfiction prose in such areas as biography, history, science, and technology. The content of the course will vary according to the design of the instructor.

If the course is given as an elective primarily for students in the Master of Technical and Professional Writing program, it should include science writing and writing about technology. Such a course could, for example, be primarily historical, focusing on writers in the nineteenth century and before, including Leonardo DaVinci, Galileo, Newton, Faraday, Darwin and others. An alternate topic might be writing about science and technology for the modern, educated lay audience. Works might be examined for the importance of the technological and scientific developments they cover, for their relation to views about science and technology in modern America, and for the authors' importance as stylists.

ENG 3359 Writing Workshop

This course is designed to provide advanced training in varied forms of writing. In different years, the topics could be such specialized areas as fiction, poetry, professional writing, and writing for academic administrators. In this course, intensive writing will be expected by the student and extensive comment by the professor.

ENG 3360 Writing Workshop

This course is designed to provide advanced training in varied forms of writing. In different years, the topics could be such specialized areas as fiction,

poetry, professional writing for academic administrators. Intensive writing will be expected by the student and extensive comment by the professor.

ENG 3361 Topics in Literary Study

Varied topics will deal with literature on a thematic, formal, or generic basis. Some possible topics might be: Literature in the Jazz Age, The Tragic Hero, The Poetry of Nature. Topics will vary from year to year.

ENG 3380 Prose Writing I

This is a course in the writing of various types of nonfiction prose, including reviews, reports, biography, commentary, research, personal narrative, travel, and others developed by the participant in consultation with the instructor. The course will focus on concepts of content, point of view, organization, style, and stages of composition.

ENG 3381 Prose Writing II

This course continues Prose Writing I. The goal of the course is to reinforce writing theory and practice, to introduce the professional concerns of writers, and to prepare writing for possible publication. Participants will refine techniques of composition and will examine the rhetorical methods of description, narration, exposition, and persuasion. The course will review such writers' markets as newspapers, popular magazines, and scholarly journals. When possible, professional writers will be featured as guest speakers.

ENG 3384 Rhetorical Theory

This course will trace the history of rhetoric and examine the major contemporary theories in the field. Consideration will begin with the classical rhetoric of Aristotle, Plato, Cicero, and Quintilian and end with the modern formulations of rhetoric by I.A. Richards, Philip Wheelwright, Alexander Bain, James Moffett, and James Kinneavy.

Rhetoric will be examined in terms of traditional modes of classifying discourse—description, narration, exposition, and persuasion—as well as modern reclassifications—expressive, referential, literary, and other modes. The course will also review rhetorical strategies for invention in the composing process: Burke's dramatistic method, Rohman's prewriting, and Pike's tagmemics.

ENG 3385 Writing about Literature and Other Disciplines

This course will examine some characteristic student and professional writing in the humanities, sciences, and social sciences.

The goal of the course is to help participants see how students can use writing as a way of knowing and learning, not just in the English class but, for example, in the biology, history, or even mathematics class as well.

This course will focus on selected readings from relevant professional journals, popular magazines, and textbooks. Participants will analyze the

content, style, and rhetorical method of these materials, as well as review writing tasks common to the disciplines.

ENG 3386 Research in Composition

The goal of this course is to prepare publication of research by providing a working knowledge of sources, current scholarship, and standards of publication. To this end, the course will acquaint participants with various bibliographies, journals, texts, and monographs that constitute the important documents of the field. Participants will use these documents to pursue research topics in invention, structure and form, modes of discourse, the composing process, and pedagogy.

ENG 3387 Case Study Design

This course will prepare participants for research to be conducted in Field Work during the academic year at the home institution. Participants will examine some published case studies of teaching and writings, and will explore relevant methods of data analysis, observation techniques, interview and questionnaire construction, sampling procedures, experimental design, and writing protocol analysis.

ENG 3388 Field Work

During the academic year, participants will conduct the independent research planned in Case Study Design.

The resources available for this research at the home institution will include the participants' individual teaching practices, course or departmental curriculum, the writing of their students and of students in other classes, the practices of other teachers and administrators, as well as published books, reports, and articles on composition. They will collect, collate, and interpret data according to the guidelines established at the Institute. They will then prepare a project in which they present their findings.

ENG 3389 Case Study Analysis

Participants who have prepared Field Work projects will present their findings, draw their conclusions, and discuss the implications of their research for further study. Participants will be guided toward possible publication of their work in relevant composition journals.

This course concludes the Case Study Design, Field Work, and Case Study Analysis sequence.

ENG 3400 English Grammar

Methods and analytic procedures (but not the formalism) of modern linguistics are used to justify and support categories, distinctions, and structure used to describe sentences. These categories, distinctions, and structures will come mainly from the framework of traditional grammar. However, the inconsistencies and arbitrariness common in traditional grammar will be replaced by modern analyses, informally presented.

ENG 3401 Semantics

The relation between language and behavior; the concept of change, variety, and uniqueness; symbols, levels of abstraction, habits of evaluation of linguistic phenomena; representation of meaning in language.

ENG 3402 History of the English Language

Topics include the development of the sound system from Old English to the present; changes in the inflectional system and corresponding developments in sentence structure; processes of word formation and shifts in meaning. Poetry, prose, and nonfictional readings supplement the text.

ENG 3403 Topics in Linguistics

Subject to be announced.

ENG 3404 Language and Its Structure

Introduction to the study of language, the principles and methods of linguistic description; the development of the science of language, of descriptive and generative linguistics. Emphasis on goals of modern linguistic theory.

ENG 3405 Descriptive Linguistics

Intonation (stress, pitch, juncture); phonemics; morphemes and morphology; syntactic devices; the process of communication; variation in speech.

ENG 3406 Transformational and Generative Grammar of English

Deep and surface structures and transformations necessary to generate the latter; graphic representations of structure; deep-structure nature of adjectives, pronouns, prepositions, auxiliaries, possessives, comparison with traditional grammar.

ENG 3407 Children's Literature

A study of history and major forms of children's literature in the English language. The course covers such topics as folktales and folklore, novels, poetry, and informational books and includes cultural and sociological theories of childhood and adolescence.

ENG 3408 Literature and the Visual Arts

Examination of the complex relationships between literature and visual arts. Consideration of such topics as theoretical approaches to this relationship, the work of painter-poets, verbal descriptions of art (e.g., poems about paintings), works in which verbal and visual art are integrated. The course is organized by issues rather than historically. Each student is expected to work on an individual project. Field trips are included as part of the course.

ENG 3409 Literature and Psychology

An examination of theoretical positions and practical problems in the relationships between literature and psychology. Psychological interpreta-

tions of lyrics, works of fiction, and dramas are examined. In addition to the selected essays on certain literary works, several theoretical texts are studied.

ENG 3410 Short Fiction

The short stories of Sherwood Anderson and Ernest Hemingway and their contribution to American literature.

ENG 3411 Comic Drama

The Comic Spirit and its manifestations in dramatic literature and performance. The nature and forms of comic playwriting from Aristophanes to the present. An examination of the theater's comic forms: farce, comedy, satire, parody.

ENG 3412 Tragic Drama

This course considers important theories of tragedy and certain plays in an effort to consider the relation, if any, which exists between theory and practice of the tragic genre.

ENG 3413 Humor in American Literature

An account of American humorous writing from 1830 to the present. Various types of literary humorists are studied, such as Artemus Ward, Mark Twain, George Harris, and others. Some attention also to such modern humorists as Thurber.

ENG 3414 Satire

A theoretical study of satiric forms—Roman, renaissance and neoclassical verse satire, and later satiric narratives. Writers surveyed can include Horace, Juvenal, Pope, Swift, Voltaire, Byron, Evelyn Waugh.

ENG 3415 Literary Impressionism

Intensive study of this theory of impressionism (with some attention to music and painting as well as literature) and its role in literary history. Readings explore French, British, Scandinavian, and American writers, especially Crane, Ford, Conrad, James, Moore, Hemingway, and Faulkner.

ENG 3550 Classical Backgrounds

Readings in translation of Greek and Roman literature pertinent to the study of English and American literature. Focus upon the development of genre and theme.

ENG 3551 Chaucer's *Troilus and Criseyde*

A detailed examination of the poem.

ENG 3552 Chaucer's *Canterbury Tales*

Selected *Canterbury Tales*.

ENG 3553 Middle English Lyrics and Drama

A study of the epic and romance, concentrating on the transformation of the epic to the courtly hero: works to include in translation *Beowulf*, *Chretien de Troyes*, the *Nibelungenlied*, and *le Morte D'Arthur*.

ENG 3554 Studies in Fourteenth-Century Literature

Major works in non-Chaucerian Middle English including *Sir Gawain and The Green Knight*.

ENG 3555 Tudor Poetry

Wyatt and Surrey, Sidney, Marlowe, Spenser, Shakespeare: the poems of courtly love and the reaction against it.

ENG 3556 Renaissance Drama

Twelve representative Elizabethan and Jacobean comedies and tragedies.

ENG 3557 Shakespeare's Histories

The English history plays from *Richard III* to *Richard V*, plus *Titus Andronicus*, *Julius Caesar*, and *Troilus and Cressida*.

ENG 3558 Shakespeare's Tragedies

Eight plays from *Richard II* to *Antony and Cleopatra*.

ENG 3559 Shakespeare's Comedies

Eight plays from *Comedy of Errors* to *The Tempest*.

ENG 3560 Problems of Shakespearean Interpretation

A study of various "problematic" plays; a general knowledge of Shakespearean drama and the sonnets is presumed.

ENG 3561 Seventeenth-Century Literature

Major prose and poetry of the seventeenth century, excluding drama: Bacon, Hobbes, Browne, Bunyan, Donne, Herbert, Johnson, Marvell, and others.

ENG 3562 Milton's Major Poetry

Milton's poetic and intellectual achievement is studied through analysis of his major works. Particular emphasis is given to *Paradise Lost* as an expression of Renaissance humanism and the culmination to the epic tradition.

ENG 3563 Restoration and Early Eighteenth-Century Literature

A critical study of neoclassical drama, poetry, and criticism; Restoration drama, Dryden, Pope, Addison, Steele, and Gay.

ENG 3564 Age of Johnson

Johnson, Boswell, and the Club: Burke, Goldsmith, and Gibbon; poetry of Cowper, Gray, Burns, and Smart.

ENG 3565 Topics in Augustan Literature

Subject to be announced.

ENG 3566 Eighteenth-Century Fiction

Novels by Defoe, Fielding, Richardson, Smollett, Sterne, and Austen.

ENG 3567 Individual Eighteenth-Century Novelist

Subject to be announced.

ENG 3568 Romantic Poetry I

A study of the first generation of British poets (Blake, Wordsworth, Coleridge) whose concern for individual dignity and imaginative freedom came to be characterized as Romanticism.

ENG 3569 Romantic Poetry II

Second generation of British Romantics: Byron, Keats, Shelley.

ENG 3570 Topics in Romanticism

Romantic attitudes toward mankind in relation to self, society, and the universe, and Romantic attitudes toward the individual person as poet, with the impact these attitudes have upon the form and thematic substance of authentic and fictional autobiography in poetry and prose. May include an intensive reading of one major British writer whose attitudes, themes, style, and philosophy are representative of the Romantic Era (1794–1832).

ENG 3571 Victorian Literature

General survey touching upon major genres in Victorian literature with emphasis on the transition from the Victorian to the "modern," including such writers as Carlyle, Ruskin, the Brontës, Swinburne, Pater, Wilde.

ENG 3572 Victorian Poetry

A close study of Tennyson, Browning, Arnold; also the pre-Raphaelite circle and the movement toward modernism: D.G. Rossetti, Swinburne, G.M. Hopkins.

ENG 3573 Victorian Novel

Close study of major works by Dickens, Eliot, the Brontës, Hardy.

ENG 3574 Individual Victorian Novelist

Subject to be announced.

ENG 3575 Topics in Victorian Literature

Subject to be announced.

ENG 3576 Twentieth-Century British Literature

Theme and structure in the work of several dramatists from Shaw to Osborne and of several novelists from Conrad to Anthony Powell, with an emphasis on major trends in the novel and in drama during the present century.

ENG 3577 Early Twentieth-Century British Poetry

Twentieth-century poets whose work has shaped and established the modern tradition or extended our understanding of the traditions of the past: Hardy, Yeats, Lawrence, Muir, Auden, Owen, Thomas.

ENG 3578 Contemporary British Poetry

A seminar concentrating on the main currents in British poetry since 1945, including an examination of the later work of the poets of Auden's generation as well as such writers as Philip Larkin, Edwin Muir, William Flomer, A.D. Hope, Basil Bunting, and others, especially those younger writers whose work represents a break with established traditions.

ENG 3579 Individual Modern British Poet

Subject to be announced.

ENG 3580 Twentieth-Century British Fiction

Major figures of the modern and the contemporary periods: Conrad, Joyce, Cary, Beckett, Braine, Fowles, Snow, Lawrence, Woolf, Murdoch, Lessing, Huxley.

ENG 3581 Individual Modern British Novelist

Subject to be announced.

ENG 3582 Twentieth-Century Irish Renaissance

A study of the emergence of a distinctive Irish literary tradition through concentration on the work of the main figures of the Irish literary revival, with particular emphasis on Yeats, Joyce, Synge, and O'Casey; minor concentration is on post-Revolutionary and contemporary Irish writers: O'Faolain, O'Connor, and Behan.

ENG 3583 Early American Literature

A survey of American literature during its first two centuries, from the puritans to the Knickerbockers, from William Bradford to James Fenimore Cooper.

ENG 3584 Literature of the Early Republic

The beginning of the American literary tradition in poetry, prose, fiction and drama: Freneau and Bryant, Bartram and Irving, Browne and Cooper, Tyler and Dunlap.

ENG 3585 Nineteenth-Century American Literature

A critical examination of selected works of prose and poetry by major writers of the period: Poe, Hawthorne, Melville, Thoreau, Dickinson, and Longfellow.

ENG 3586 American Literature 1830–1865

Subject to be announced.

ENG 3587 Nineteenth-Century American Poetry

Subject to be announced.

ENG 3588 The Romance in America

An attempt to define the American Romance through the study of Cooper's *Leatherstocking* novels, the major novels of Hawthorne, and Melville's *Moby Dick* and *Billy Budd*.

ENG 3589 The Rise of Realism

An examination of local colorism, realism, and naturalism in the works of Twain, Howells, James, Dreiser, Norris; and readings in European realism.

ENG 3590 Literature of the American South

A study of the southern literary experience from early nineteenth century to mid twentieth, from Simms to Faulkner.

ENG 3591 Twentieth-Century American Poetry

Twentieth-century poets who have struggled to establish a tradition for American poetry and whose examples have dominated poetry up to the present: Robinson, Frost, Stevens, W.C. Williams, M. Moore, Eliot, Pound, Crane, Cummings, and the Fugitives.

ENG 3592 Modern American Drama

Philosophic and aesthetic trends among such playwrights as O'Neill, Williams, Miller, Albee, Simon, and others.

ENG 3593 Individual Modern American Poet

Subject to be announced.

ENG 3594 Modern American Novel

Subject to be announced.

ENG 3595 Individual Modern American Novelist

An in-depth examination of the work of a major figure in American fiction, focusing on the cultural context out of which he or she emerges. Recent selections for this course have been Hemingway, Fitzgerald, Mailer, Faulkner, and Bellow.

ENG 3596 Individual American Writer

Subject to be announced.

ENG 3597 Contemporary American Poetry

Subject to be announced.

ENG 3598 Twentieth-Century American Fiction

Adams, Dreiser, Crane, Dos Passos, Fitzgerald, Cozzens, Faulkner. The beginnings and development of modern American fiction.

ENG 3600 Nineteenth-Century European Novel

Examination of major novelists and major literary movements in nineteenth-century Europe. Discussion of such novelists as Balzac, Stendhal, Huysmans, Flaubert, Dostoevski, Turgenev, and Hardy.

ENG 3601 Thesis

Six quarter-hours maximum; by arrangement.

ENG 3602 Independent Study

By arrangement.

History

All courses carry three quarter-hours of credit except seminars, which carry four quarter-hours, and other courses where noted.

HST 3241 Methodology

The objectives, methods, and resources of the historian.

HST 3242 European Historiography

The development of historical writing from ancient times to the present.

HST 3243 American Historians

The writing of American history by Americans, from colonial times to the present, with emphasis on changes in both form and substance.

HST 3301 Ancient Greece (Group I)

Selected topics in the history of ancient Greece.

HST 3302 Ancient Rome (Group I)

Selected topics in the history of Rome in the period of the Republic or the Empire.

HST 3306 The Renaissance (Group I)

European political and cultural life from the thirteenth to the seventeenth centuries, with attention to humanism and to the rebirth of classicism in literature and the arts.

HST 3307 The Reformation (Group I)

The development of the Christian Church from the thirteenth to the seventeenth centuries, with attention to the conflict between church and state, the impact of the Renaissance, the rise of the Protestant sects, and the wars of religion.

HST 3310 Intellectual History of Europe, 1688-1789 (Group I)

The broad spectrum of eighteenth-century thought, with emphasis on scientific, religious, and political ideas.

HST 3311 Intellectual History of Europe, 1789-1870 (Group I)

The great age of liberal and nationalistic thought. Social problems created by industrialism and various proposals to solve these problems are examined.

HST 3312 Intellectual History of Europe, 1870-1950 (Group I)

The intellectual developments which have brought Europe to its present position in world affairs. Topics considered include theories of evolution, scientism, radical socialism, and fascism.

HST 3315 Diplomatic History of Europe, 1815-1914 (Group I)

The foreign policies of the chief European powers, with emphasis on changing alliances and alignments, imperialistic rivalries, and efforts at international cooperation.

HST 3318 Imperialism (Group I)

The rise and development of colonial empires with emphasis on the 19th century. The nature of empire, motives for imperial expansion, and the colonial heritage.

HST 3320 Twentieth-Century Europe (Group I)

The political history of Europe since 1900, with attention to World War I, the rise of communism and fascism, the struggle for security in the western democracies, World War II, and the Cold War.

HST 3322 Socialism and Revolution (Group I)

Studies in the history of socialism and revolution from the early nineteenth-century utopias to the New Left of the 1960s.

HST 3330 Britain, 1688-1815 (Group I)

Topics include constitutional evolution, political parties, social and economic change, religious and intellectual developments, cultural achievements, and Scotland and Ireland.

HST 3331 Britain, 1815-1914 (Group I)

Aspects of nineteenth-century Britain, including reform of Parliament, liberalism and socialism, the Irish question, imperialism, and Victorian ideas and attitudes.

HST 3332 Britain since 1914 (Group I)

A social and political history with emphasis on the manner in which incompetent leadership and futile class struggle contributed to Britain's failure as a world power.

HST 3339 The Modernization of Ireland (Group I)

Analysis of themes in the growth and development of modern Ireland. Topics examined include migration and its effects on a traditional society, the role of religion in the assertion of national independence, and modernization within the British nexus.

HST 3345 Hitler's Germany (Group I)

A study of the history of the Third Reich, including an in-depth analysis of the process by which the political motives and methods of the Nazis ultimately won the support of the German people.

HST 3370 Family History (Group I or II)

An examination of the history of the family in Europe and America from the *ancien regime* to the present with attention to demographic issues and trends, industrialization and the family, women's roles, child-rearing practices, the changing nature of marriages and divorce, and life cycle and aging.

HST 3380 Seminar in the Renaissance (Group I)

Research and writing concerning the Renaissance.

HST 3381 Seminar in the Reformation (Group I)

Research and writing concerning the Reformation.

HST 3382 Seminar in European Intellectual History (Group I)

Research and writing on special topics in European intellectual history.

HST 3383 Seminar in Nineteenth-Century Europe (Group I)

Research and writing in European history from 1850 to 1900.

HST 3384 Seminar in Twentieth-Century Europe (Group I)

A study of a selected controversy in contemporary European history.

HST 3385 Seminar in European Social History (Group I)

Focusing on Britain, France, and Germany in the nineteenth and early-twentieth centuries and looking at history "from below," this course examines comparative issues in European social history. Topics include the nature of social protest, the rise of organized labor, and the impact of war and revolution on the lives of ordinary people.

HST 3386 Seminar in Imperialism (Group I)

An inquiry into the motives underlying European expansion in the late nineteenth century.

HST 3387 Seminar in Nineteenth-Century Britain (Group I)

Selected topics for research and writing with special emphasis on the social effects of industrialization.

HST 3388 Seminar in Twentieth-Century Britain (Group I)

Selected topics for research and writing.

HST 3389 Seminar in Modern France (Group I)

Research, writing, and collective analysis of several themes in modern French social history since 1789, including the role of social class in revolutionary protest, industrialization, technology and modernization, the rise of the working class and the development of organized labor, the French peasantry in an industrial society, the nature of the family, and women's roles.

HST 3390 Seminar in Russian History (Group I)

A narrow period or special topic in Russian history. *The course presupposes a basic knowledge of Russian history and requires extensive work on a research paper.*

HST 3397 Seminar in Comparative Labor History

Analysis of issues in the history of the European labor movement, focusing on 19th and 20th century Britain, France, and Germany. Issues include: the meaning of the concept of class in labor history; labor movements and politics (working-class conservatism and working-class radicalism); the place of women in the working class and in the labor movement; worker responses to mechanization, automation and scientific management in the 20th century.

HST 3399 Seminar in Approaches to Women's History (Groups I, II, or III)

Study focuses on current issues in women's history and the methods historians use to study women's historical roles in the market place, work force, political arena, and domestic scene in Europe, Asia, the United States, and Latin America. Emphasis is on the importance of comparative and interdisciplinary approaches to the history of women. The seminar includes lectures and discussions with specialists using various approaches, assigned reading, and an independent project.

HST 3404 Colonial America: The Seventeenth Century (Group II)

Exploration of the New World, settlement of the English North American mainland colonies, and the adaptation of European institutions and ideas to New World conditions.

HST 3405 Colonial America: The Eighteenth Century (Group II)

The expansion of the English colonies in the New World, the development of political and social institutions, and the sources of friction with England to 1763.

HST 3407 The American Revolution (Group II)

Topics in the history of the American Revolution from 1763 to 1783.

HST 3410 Topics in American Reform (Group II)

Selected studies of movements to change aspects of American society.

HST 3413 Topics in the Civil War and Reconstruction (Group II)

Analysis of key issues surrounding the events leading up to the Civil War, the war itself, and the Reconstruction period.

HST 3420 Public Life in Nineteenth-Century America (Group II)

Analysis of public policy and policy making; governmental structure, relations, and ideology; and electoral systems, viewed in long-run perspective.

HST 3421 Political Change in Twentieth-Century America (Group II)

Analysis of the growth of governmental function and structure, emphasizing the evolution and administration of leading policy concerns of the current century, changes in federalism and inter-governmental relations, and patterns of popular political participation and thinking.

HST 3423 The Age of Roosevelt (Group II)

An analysis of the foreign and domestic policies and programs of the four Roosevelt administrations, set within the context of the world-wide depression and global war. Emphasis is on the range of recent interpretations and analytic methods used in evaluating the place of Roosevelt in American history.

HST 3434 American Social History, 1900-1950 (Group II)

The transformation of the naive and idealistic America of the early twentieth century to life in a world in which technology has far outstripped man's mental and moral capacity to cope with it.

HST 3440 African-American History I (Group II)

The history of African-Americans to 1900, with emphasis on the role of black people in slavery and freedom.

HST 3441 African-American History II (Group II)

The history of African-Americans since 1900.

HST 3442 New Perspectives on American Slavery (Group II)

An in-depth examination of slavery in the Americas. Special emphasis will be placed on the impact of the slave trade; the development of slavery as an institution; the impact of slavery on the black family; the key role played by the black church; black resistance to slavery; the historiography of slavery, especially the two decades of reaction to the still-controversial thesis of Stanley Elkins; and slavery from a comparative perspective, contrasting slavery in Latin America and the United States.

HST 3450 Boston as a City (Group II)

An in-depth examination of historic Boston from 1822 to the present. Emphasis is on Boston's early growth as a city, the Hub as a center of pre-Civil War reform, the coming of the Irish, Boston as America's Athens, the revolutionary shift from Yankee to Irish political domination, the flamboyant era of James Michael Curley, and the development of the "New Boston."

HST 3480 Seminar in American History (Group II)

Research and writing on selected aspects of American history.

HST 3481 Seminar in Colonial and Revolutionary America (Group II)

Research and writing on some topic in American history prior to 1789.

HST 3482 Seminar in American Governmental History (Group II)

Concentrated attention to a particular problem or theme in American governmental history, emphasizing individual student research and writing.

HST 3483 Seminar in American Urban History (Group II)

The political, economic, and social history of America's major cities, with special emphasis on Boston's last century.

HST 3484 Seminar in American Maritime History (Group II)

Examination of selected aspects of American maritime history. Possible topics range from early exploration to the age of nuclear propulsion and may include merchant and naval aspects of the subject.

HST 3485 Seminar in African-American History (Group II)

Research and writing on an aspect of African-American history.

HST 3486 Seminar in Recent American History (Group II)

Special topics from the period 1896 to the present studied in detail. Students are expected to present a research paper on a major person, action, or movement.

HST 3501 History of Exploration (Group III)

A comprehensive survey of exploration from ancient times to the present with emphasis on the motives for exploration and their impact on the regions discovered and on those doing the discovering.

HST 3503 Approaches to World History (Group III)

An interdisciplinary examination of the study of civilization emphasizing various methodologies and theories and testing them by studying specific historical periods and cultures.

HST 3505 Canada and the United States (Group III)

How and why a separate Canadian nation managed to emerge despite decades of American political and military threats. Examination also includes Canada's subsequent response to growing cultural and economic domination by the United States.

HST 3508 Modern Africa (Group III)

A topical approach to the history of Africa since 1850.

HST 3510 History of the Islamic Peoples (Group III)

A study of the history, culture, and religion of the followers of Muhammad from 600 to 1800.

HST 3512 Modern Middle East (Group III)

A study of the Middle East in the twentieth century.

HST 3523 Modern Japan (Group III)

The history of Japan since the fall of the Tokugawa, emphasizing political and economic developments, especially after World War II.

HST 3529 Communism in China (Group III)

A study of the Chinese Communist movement from its origins in the 1920s to the present.

HST 3531 Population in History (Group III)

An application of demographic theory to history.

HST 3533 Psycho-History (Group III)

An introduction to the concepts, scholarship, problems, and directions of psychohistorical studies.

HST 3540 Economic History of the Modern Western World (Group III)

Topical analysis of the economic development of the modern Western world.

HST 3601 Historical Administration (Group III)

The administration of historical agencies with attention to problems of finance and personnel and to the legal-governmental environment in which agencies operate.

HST 3602 Historical Societies and Archives (Group III)

The varieties of historical societies (local, state, and national) and the kinds of private (business, college, church) and public (local, state, and national) archives; their activities and procedures; their similarities and differences.

HST 3603 Historical Exhibits and Museums (Group III)

Approaches, techniques, and special problems in the presentation of history to the public through exhibits, films, and other audiovisual and written media. Guest lecturers from the field present lectures, and students have the opportunity to gain practical experience.

HST 3605 Historical Editing (Group III)

A laboratory for the study and practice of historical editing. Students are introduced to the major collections of edited papers and instructed in editing historical documents. Each student is given an historical document to prepare for publication. Instruction also covers the editing of history books and journals.

HST 3610 Industrial Archeology (Group III)

An introduction to the history, practice, and place of industrial archeology. There will be examination of techniques and procedures used to unearth the industrial past. Field trips to local industrial sites will be taken.

HST 3611 Historic Preservation (Group III)

An introduction to historic preservation, with attention to the history, the philosophy, and the practical problems of preservation.

HST 3620 Oral History (Group III)

The theory and practice of creating, processing, and using primary source material obtained by taping interviews with people whose role in history would otherwise go unrecorded.

HST 3621 Genealogical Research: Methods and Uses (Group III)

An analysis of the tools and sources available to genealogists and historians with attention to historical applications of such data. Students will have opportunity to use various records essential to the writing of family history.

HST 3622 Local History Methodology (Group III)

An examination of the development and uses of local history with special attention to the methodological aspects of this burgeoning field. Publications of local historical societies and museums will receive particular attention.

HST 3625 Media and History (Group III)

Students will have the opportunity to explore such topics as the advantages and drawbacks of specific media, the uses and abuses of media in research and teaching, and the construction of media. Each student is required to participate in a research project involving the creation and/or evaluation of historically valid films, slide tapes, and other materials.

HST 3798 Master's Thesis Continuation 0 Q.H.**HST 3805 Assigned Reading 1 Q.H.**

Assigned reading under supervision of a faculty member.

HST 3811 Thesis 9 Q.H.

Thesis supervision by members of the department.

HST 3821 Fieldwork in History I 4 Q.H.

Fieldwork offers students the opportunity to get practical experience in historical agencies (in-

cluding historical societies, archives, museums, exhibits, restorations, preservation projects, and the like). Students are required to work in the agency eight to ten hours a week for one quarter under the direction of an agency supervisor and departmental adviser.

HST 3822 Fieldwork in History II 4 Q.H.
A second opportunity for students to acquire practical experience in an historical agency. The fieldwork placement requires eight to ten hours a week for one quarter under the direction of an agency supervisor and a departmental adviser.

Law, Policy and Society

Core Courses

ECN 3210 Microeconomics

(Economics, 4 Q.H.)

This course addresses the basic question of resource allocation within our society, a question central to issues concerning the appropriate role of government intervention in the private economy, the efficiency and equity of public expenditure-regulation programs, and the costs imposed on society by various activities that are unregulated or uncontrolled. A more detailed description of this course can be found in this catalogue under "Description of Courses for the Economics Department."

INT 3249, 3250 Law, Policy, and Society Survey (Interdisciplinary, 4 Q.H.)

This course is intended to offer students the opportunity to form a foundation derived from several disciplines in the range of methodologies and perspectives that are employed in the study of law and society. Among topics to be examined are issues such as normative vs. formative functions of law, social control vs. individual freedom, and legal bases of conflict management in society. Although the course is coordinated by one instructor, faculty affiliates of the program participate in

the course, permitting approaches and specific content to be presented by and discussed from a variety of informed perspectives.

LAW 2364 Legal Research and Bibliography (Law, 1 Q.H.)

This course is open only to students in the Law, Policy and Society Program. It is designed to introduce them to the resources and the use of the Law Library and the basic techniques of legal research.

SOC 3113 Introduction to Research Methods (Sociology, 2 Q.H.)

An introduction to methods of social research including field study and participant observation techniques, survey techniques, interviewing and questionnaire construction, sampling procedures, experimental design, content analysis, and uses of available data. Open only to Law, Policy and Society students.

SOC 3114 Introduction to Quantitative Research Methods (Sociology, 2 Q.H.)

An introduction to quantitative techniques of analysis. Students are expected to conduct individual research projects. Open only to Law, Policy and Society students. *Prep.: SOC 3113 or its equivalent.*

Mathematics

The following courses are offered for those who wish to enter the master's degree program in mathematics, but who fail to satisfy the admission requirements. These courses are taken in addition to the required course work in mathematics.

MTH 3001, MTH 3002, MTH 3003 Abstract Algebra I, II, III 2 Q.H.

Groups, subgroups, normal subgroups, rings, ideals, integral domains, and fields. *Prep.: Differential and integral calculus.*

MTH 3004 Advanced Calculus I 2 Q.H.

Functions of one independent variable; limits, continuity, differentiability properties of continuous functions on a closed bounded interval. Rolle's theorem and the mean-value theorem. *Prep.: Differential and integral calculus.*

MTH 3005 Advanced Calculus II 2 Q.H.

Functions of several independent variables. Distance and open sets, limits continuity. Properties of continuous functions on a closed bounded set. Differentiability and differentials, mean-value

theorem, implicit function theorems, Jacobians and transformations. *Prep.: MTH 3004.*

MTH 3006 Advanced Calculus III 2 Q.H.

Sequences, sequences of functions, uniform convergence, series. Integration, line and surface integrals. *Prep.: MTH 3005.*

MTH 3011 A First Course in Mathematical Logic 2 Q.H.

Propositional calculus, quantificational logic, first order theories through the Skolem-Lowenheim Theorem.

MTH 3012 An Introduction to Recursive Function Theory 2 Q.H.

Turing machines. Partially computable functions. Firmative recursive and general recursive functions and predicates. Unsolvable decision prob-

lems. Recursively enumerable sets to integers. The unsolvability of Hilbert's Tenth problem.

MTH 3013 Gödel's Incompleteness Theorem

2 Q.H.

Formal number theory. Arithmetization. Gödel's First and Second Incompleteness Theorems for formal number theory. *Prep.: A knowledge of the methods of mathematical logic.*

MTH 3014 Set Theory

2 Q.H.

The informal study of sets, including detailed discussion of the axiom of choice, well-ordered sets, and transfinite arithmetic.

MTH 3015 Formal Set Theory

2 Q.H.

Versions to axiomatic set theory. The consistency of the continuum hypothesis and the axiom of choice. As time permits, the independence of the continuum hypothesis and the axiom of choice. *Prep.: The equivalent of 10.8k2 and MTH 3014.*

MTH 3101 Analysis I

4 Q.H.

Basic topic in analysis and topology, including metric spaces and normed linear spaces; continuity; compactness; completeness; differentiability; function spaces; polynomial approximations. *Prep.: Advanced calculus.*

MTH 3102 Algebra I

4 Q.H.

Emphasis on group theory and linear algebra, including definition of rings and modules. Groups: subgroups, cyclic groups, cosets, Lagrange's Theorem, normal subgroups, homomorphisms and automorphisms, permutations (cycle decomposition, parity, conjugacy classes). First and second isomorphism theorems, class equation, Sylow subgroups, direct products, finitely generated abelian groups. Linear algebra: bases and dimension, correspondence between linear transformations and matrices, systems of linear equations, row reduction, rank, determinant inner products. Gram-Schmidt; dual spaces; eigenvalues and eigenvectors; characteristic polynomial; minimal polynomial; spectral theorem for symmetric, hermitian, and unitary matrices,

MTH 3103 Analysis II

4 Q.H.

Complex function theory, including the method of residues; evaluation to series and integrals; differential forms.

MTH 3104 Algebra II

4 Q.H.

Finite extensions of fields, automorphisms, structure of finite fields, normal and separable extensions, Galois group, Fundamental Theorem of Galois Theory, cyclotomic fields, solvability of equations by radicals.

MTH 3105 Topology I

4 Q.H.

General topological spaces. Compactness and connectedness. Separation properties. Products. Complete metric spaces. Baire category theorem. Quotient spaces. Function spaces. Elementary homotopy. Some of the functorial viewpoint.

MTH 3106 Analysis III

4 Q.H.

Lebesgue measure and integration, convergence theorems. Applications to probability theory and Fourier series.

MTH 3107 Topology II

4 Q.H.

Simplicial complexes, manifolds. Classification of surfaces. Orientation. Euler characteristic. Vector fields. Mod 2 degree to a map. Linear group manifolds. Fundamental groups, covering spaces. Seiter-Van Kampen Theorem. Fundamental group of surfaces.

MTH 3221 Biostatistics

2 Q.H.

Methods of statistical inference with applications to biology and the medical sciences.

MTH 3222 Applied Statistics

4 Q.H.

Level to measurement, central tendency, dispersion, relatedness and significance to differences, analysis of data through correlation, regression, F-test, Chi square tests, T-test, analysis of variance and analysis of covariance. These analyses are accomplished using computer-based statistical subroutine packages. *Not for math graduate credit.*

MTH 3231 Introduction to Computer Programming and Applications

4 Q.H.

This course is intended for graduate students in sciences, social sciences, and humanities who need to understand how computers can help solve problems in their fields of study. After instruction in the basics of computer programming and algorithm development, students are introduced to examples of the computers used in different areas of human endeavor. Students are required to write programs in BASIC programming language and run them on a computer. *This course cannot be taken for credit by graduate students in the Mathematics Department.*

MTH 3302 Constructive Algebra

4 Q.H.

A constructive development of some of the old familiar areas of algebra: principal ideal domains, Dedekind domains, factorial domains, Noetherian rings.

MTH 3303 Set Theory

4 Q.H.

First part: Informal study of sets, including detailed discussion of the axiom of choice, well ordered sets, and transfinite arithmetic. Second part: versions of axiomatic set theory. The consistency of the continuum hypothesis and the axiom of choice. As time permits, the independence of the continuum hypothesis and the axiom of choice.

MTH 3305, MTH 3306 Philosophy of Science and Mathematics I, II

4 Q.H. each

Topics may vary from year to year. Past subjects have included the foundations of statistical inference, the structure of scientific theories, and analysis of the conceptual structure of mathematics.

MTH 3311 Mathematical Logic 4 Q.H.

This course combines material of MTH 3011 and MTH 3013.

MTH 3321 Algebra III 4 Q.H.

Rings, ideals, factor rings, prime and maximal ideals, principal and ideal domains, polynomial rings, unique factorization and Gauss' Theorem, modules, Hilbert Basis Theorem, Noetherian rings and modules, Artin rings, matrix rings, Wedderburn's structure theorem for simple Artin rings, exact sequences, tensor products.

MTH 3331 Homological Algebra 4 Q.H.

Basic properties of categories and functors; sums, products, morphisms; Hom, Tensor product, and their derived functors Ext and Tor; exact sequences, homology and co-homology; homological dimension and co-dimension; applications to algebra and topology.

MTH 3332 Commutative Algebra 4 Q.H.

Prime ideals, localization, integral extensions; primary decomposition; Krull dimension; chain conditions, Noetherian and Artinian modules; additional topics from ring and module theory as time permits.

MTH 3341 Applied Mathematics I 4 Q.H.

Deterministic models in the physical and life sciences. Regular and singular perturbation: dimensional analysis; linear and nonlinear boundary layer problems; WKB theory; multiple scale analysis; qualitative analysis in phase science; singular perturbation of PDEs, asymptotic analysis.

MTH 3342 Applied Mathematics II 4 Q.H.

Partial differential equations and modeling. Method of characteristics; shock waves; conservation laws; Fourier series, parabolic, hyperbolic, and elliptic equations; generalized Fourier transforms; first order systems; the Cauchy-Kowalewski theorem; well-posed problems; recent applications to scientific problems.

MTH 3351, MTH 3352 Ordinary Differential Equations I, II 4 Q.H. each

Topics in ordinary differential equations. *Prep.: Elementary Ordinary Differential Equations.*

MTH 3356 Calculus of Variations 4 Q.H.

Euler's equation for extremals; classical examples, isoperimetric problems; necessary and sufficient conditions for an extremal to be a local minimum, applications to differential geometry, physics, and economics, Hamilton-Jacobi Theory, theory of the second variation.

MTH 3361 Numerical Analysis I 4 Q.H.

Solution to boundary value problems by the finite-element method; formulation of finite elements; application to interpolation, elliptic and parabolic differential equations, and eigenvalue problems; numerical solution of problems on a computer.

MTH 3362 Numerical Analysis II 4 Q.H.

Initial value problems: Runge-Kutta and multi-step methods, finite differences and finite elements.

MTH 3371 Optimal Control Theory I 4 Q.H.

Linear and nonlinear control problems defined by ordinary differential equations, relaxed controls, existence theorems, Pontryagin's maximum principle.

MTH 3373 Optimization 4 Q.H.

Convex sets, linear and nonlinear programming, zero-sum games, dynamic programming, numerical methods.

MTH 3380 Functional Analysis 4 Q.H.

Topological vector spaces, Banach spaces, Hilbert spaces, algebras of operators, representations.

MTH 3386 Lie Theory 4 Q.H.

Lie groups and Lie algebras. The exponential map. Examples, basic structure theorems. Representation theory. Applications. Additional topics vary with the instructor and may include infinite-dimensional Lie algebras, algebraic groups, finite groups of Lie type, geometry and analysis of homogenous spaces.

MTH 3395 Dynamical Systems 4 Q.H.

Structural stability and qualitative theory of dynamical systems.

MTH 3405 Algebraic Topology 4 Q.H.

Topics from homology groups, sequences; fiber spaces; sheaves; products in homology and cohomology; cohomology algebra; Kunneth theorems; cohomology operations; Poincaré duality; higher homology groups and the Hurewicz theorem; characteristic classes, spectral sequences.

MTH 3411 Differential Geometry 4 Q.H.

Geometry of surfaces in the euclidean space, with emphasis on the global aspects, using the technique of tensor calculus. Elements of Riemannian geometry, connections. Holonomy.

MTH 3431 Probability I 4 Q.H.

Introduction to probability; independent random variables; types to convergence; laws of large numbers; characteristic functions, central limit theorem.

MTH 3432 Probability II 4 Q.H.

Introduction to stochastic processes; random walk; conditional expectations; Markov processes; multivariate normal distribution; Brownian motion.

MTH 3441 Statistics I 4 Q.H.

Parametric families of distributions; testing hypotheses; likelihood ratio tests; estimation and maximum likelihood, regression.

MTH 3443 Statistical Decision Theory 4 Q.H.

Subjective probability-utility. Bayesian approach to decision problems, including estimation, test-

ing hypotheses, and linear statistical models. Sequential decisions.

MTH 3444 Analysis of Variance 4 Q.H.
One-sample and two-sample tests; one-way ANOVA; factorial and nested designs; Cochran's theorem; regression; analysis of covariance; simultaneous confidence intervals.

MTH 3445 Topics in Statistics 4 Q.H.
Topics to be selected from multivariate statistics and clustering; categorical data, biostatistics; Stein's paradox and admissibility, foundations. May be repeated for credit.

MTH 3501 Data Structure 4 Q.H.
Basic structure for representing and manipulating data in computer programming: arrays, lists, stacks, queues, dequeues, trees, binary trees. Applications to nonnumeric computations. Searching and sorting. Students are required to write programs to implement these structures on a computer.

MTH 3502 Computer Organization and Programming 4 Q.H.
Computer organization; hardware and software components. Memory organization and addressing. Machine representation of data. Machine language and assembly programming. Subroutines and macros. Students are required to program several short exercises in assembly language and to undertake a term project at the end of the course.

MTH 3503 Compilers 4 Q.H.
Study of compilers; finite automata and lexical analysis; syntax specification; parsing; syntax-directed translation, symbol tables; run-time storage administration; error detection and recovery; code optimization, code generation. Students work as a team on a large programming project. *Prep.: knowledge of assembly language programming and some knowledge of data structures.*

MTH 3504 Systems Programming 4 Q.H.
Batch systems programs-assemblers, loaders, macro processors. I/O programming. Multiple processors and interrupt mechanisms. Addressing techniques and memory management. Processor management and job scheduling. Device management. Information management: file access, protection, and maintenance. *Prep.: MTH 3502, MTH 3501, or equivalent.*

MTH 3510 Data-Base Management 4 Q.H.
Components of data base. Hierarchical, network, and relational data-base systems. DBMS facilities: schema, subschema implementation considerations. Privacy, security, integrity, concurrency. Data directors. Distributed data bases. Comparison of available data-base management systems. *Prep.: A course in data structures.*

MTH 3512 Concurrent Programming 4 Q.H.
Programs that have several parts in execution at the same time. The logical problems that arise and

their machine implementations. Mutual exclusion, message passing, deadlock, monitors, kernels, and applications to operating systems. Programming is in the highest-level language available that supports concurrency.

MTH 3521 Theory of Automata and Formal Language 4 Q.H.
Finite-state machines and regular expressions, context-free grammars. Parsing of context-free languages. Context-sensitive grammars, push-down stores, stack machines, and linear-bounded automata. Turing machines, undecidability, description of computation using list-structures, program machines, and programs.

MTH 3522 Artificial Intelligence 4 Q.H.
Analysis of current computer programs dealing with problems such as theorem proving, chess playing, general problem solvers, robotics, symbolic computation, perceptions, self-reproducing automata, and parallel machines. *Prep.: A course in data structures.*

MTH 3525 Computer Communications System 4 Q.H.
Examples of networks such as ARPA and TYMNET; link problems such as ARQ multiplexing and protocols; queuing theory; routing problems; flow-control and cryptography. *Prep.: A course in probability and statistics.*

MTH 3527 Combinatorial Theory 4 Q.H.
Various techniques of enumerative combinatorics, including binomial and multinomial theorems, principle of inclusion-exclusion, recurrence relation, generating functions. Stirling numbers. Special topics such as distributions, partitions, and polycounting theory are also covered. Topics in Matching Theory, including Hall's theorem. Marriage Problem and Rado's Selection Principle.

MTH 3528 Combinatorial System Analysis 4 Q.H.
Topics to combinatorial analysis closely related to computer and other finite systems. These include t-designs, orthogonal Latin Squares. Difference sets and finite geometries. Algebraic coding is studied, including cyclic codes, Reed-Solomon Codes, BCH Codes, and Reed-Muller codes. *Prep.: One year of abstract algebra.*

MTH 3529 Graph Theory 4 Q.H.
Graphs and subgraphs; trees; connectivity; Euler tours and Hamilton cycles; matchings, edge colorings; independent sets and cliques; vertex colorings; planar graphs; directed graphs; networks, the cycle space and bond space.

MTH 3535 Algorithms and Complexity Theory 4 Q.H.
Data structures designed for efficient algorithms and for set manipulation problems such as lists, queues, stacks, binary search trees, and balanced tree schemes; algorithms on graphs such as

depth-first search, path-finding problems; matrix multiplication, fast Fourier Transforms, NP-complete problems, and some intractable problems. *Prep.: MTH 3527 Combinatorial Theory.*

MTH 3801 Seminar: Constructive Mathematics
4 Q.H.

MTH 3806 Readings in Algebra
up to 4 Q.H. per quarter

MTH 3807 Seminar in Algebra
up to 4 Q.H. per quarter

MTH 3811 Readings in Analysis
up to 4 Q.H. per quarter

MTH 3812 Seminar in Analysis
up to 4 Q.H. per quarter

MTH 3818 Seminar: Dynamical Systems
up to 4 Q.H.

Topics in dynamical systems as chosen by participants.

MTH 3821 Readings in Topology
up to 4 Q.H. per quarter

MTH 3822 Seminar in Topology
up to 4 Q.H. per quarter

MTH 3826 Readings in Statistics and Probability
up to 4 Q.H. per quarter

MTH 3831 Readings in Computer Science
up to 4 Q.H. per quarter

MTH 3836 Seminar in Combinatorics
up to 4 Q.H. per quarter

The department offers an assortment of courses under the general heading "Seminar" (MTH 3812-9). At the outset of each quarter, times for organizational meetings will be posted. Schedule and content are negotiated at these meetings. Students and faculty with interest in the specialty of the seminar are encouraged to attend the organizational meeting.

MTH 3850 Doctoral Dissertation

Physics

I. Introductory Courses

PHY 1305 Thermodynamics and Kinetic Theory
3 Q.H.

Topics include first and second laws of thermodynamics; entropy and equilibrium; thermodynamic potentials; elementary kinetic theory; statistical mechanics and the statistical interpretation of entropy.

PHY 1413 Introduction to Nuclear Physics
3 Q.H.

Topics include nuclear structure; nuclear masses; radioactivity-nuclear radiation; interaction of radiation and matter; detectors; fission, nuclear forces; elementary particles. *Prep.: PHY 1303 or equiv.*

PHY 1414 Introduction to Solid State Physics
3 Q.H.

This course offers a semiclassical treatment of the thermal, magnetic, and electrical properties of crystalline solids. Topics include X-ray diffraction and the reciprocal lattice; elasticity and lattice vibrations; specific heat; properties of insulators; magnetism in insulators and metals; introduction to the band theory of metals. *Prep.: 1 PHY 1305 and PHY 1303 or equiv.*

PHY 1415 Quantum Mechanics I 3 Q.H.

The first of a two-quarter sequence in quantum mechanics, this course focuses on observations of macroscopic and microscopic bodies, the uncertainty principle—wave-particle duality; probability amplitudes; Schrodinger wave theory; one-dimensional problems. *Prep.: PHY 1303 or equiv.*

PHY 1416 Quantum Mechanics II 3 Q.H.

A continuation of PHY 1415, this course covers discrete and continuous states; Schrodinger equation in three dimensions; angular momentum; general theory of quantum mechanics; applications. *Prep.: PHY 1415.*

PHY 3401 Radiation Physics 2 Q.H.

Introduction to atomic and nuclear physics for graduate students in biology and pharmacy. Topics include quantum mechanics and atomic structure, nuclear structure, radioactivity, properties of nuclear radiation, detection of radiation.

PHY 3402 Radiation Biology 2 Q.H.

The effects of radiation on biological systems and the uses of radiation in medicine and biological research. Topics selected from effects of radiation on chemical reactions; effects of radiation on cells, organs, and individuals; theories of radiation damage and repair; imaging and tracer techniques using radiopharmaceuticals; radiation safety and standards. *Prep.: PHY 3401 or equiv.*

PHY 3551, PHY 3552 Electronics for Scientists I, II 4 Q.H.

PHY 3551 and PHY 3552 form a two-quarter sequence covering electronic techniques for experiments research in many different fields of science. Topics include principles of semiconductor devices; analog techniques (amplification, feedback, integration), digital techniques (counting, multiplexing, logic); design of electronic subsystems (analog-to-digital converters, phase-sensitive detectors, data-logging systems); understanding specifications of commercial electronic equip-

ment. Lab examples make use of up-to-date integrated and discrete devices, such as are currently used in the electronic industry.

II. Required Regular Courses (offered every year)

PHY 3557 Graduate Advanced Laboratory

4 Q.H.

This course presents special projects in modern experimental physics, including electronic instrumentation used in measuring physical quantities and use of microprocessors. *Prep.: PHY 3551 and 3552 or permission of instructor.*

PHY 3561 Graduate Project Laboratory

4 Q.H.

This course allows students to select and carry out individual projects involving instrumentation and computation. The projects involve the development of some aspect of instrumentation and/or computation in an ongoing research project, and the preparation of a final report. The student will be supervised by the project leader and the course instructor. Although the course carries 4 q.h. credit, it is taken in successive winter and spring quarters. *Prep.: Permission of instructor.*

PHY 3601, PHY 3602 Mathematical

Methods A, B

4 Q.H.

Calculus of variations. Euler-Lagrange equations. Mathematical methods in physics. Topics from theory of function of a complex variable. Analytic functions. Taylor and Laurent series. Analytic continuation and classification of functions. Calculus of residues. Asymptotic series. Dispersion relations. Applications to ordinary differential equations and the study of special functions. Finite and infinite dimensional vector spaces. Linear operators. Function spaces and generalized Fourier expansions. Green's functions and integral equations. Introduction to group theory.

PHY 3603 Classical Mechanics

4 Q.H.

Generalized coordinates and Lagrangian formulation of mechanics, conservation laws. One-dimensional and central force problems. Collision theory. Rigid bodies. Hamiltonian formulation and the canonical formalism. Continuous systems and classical fields.

PHY 3611, PHY 3612, PHY 3613 Electro-magnetic Theory A, B, C

3 Q.H.

Maxwell's equations. Static field and boundary value problems, multipole expansion. Phenomenology of dielectrics, conductors, and magnetic materials. Faraday's Law. Energy and momentum; Poynting vector; Maxwell stress tensor. Plane waves, polarization. Reflection and refraction; diffraction. Relativity Radiation from sources. Motion of charged particles in electromagnetic fields; magnetic mirrors, particle accelerators. Introduction to plasma physics; magnetohydrodynamics. Radiation from acceler-

ated charges; bremsstrahlung, synchrotron radiation. Scattering of radiation; interaction of radiation with matter. *Prep.: PHY 1403, PHY 3601 (concurrently).*

PHY 3621, PHY 3622, PHY 3623 Quantum

Theory A, B, C

4 Q.H.

Experimental basis of quantum theory. Schrodinger equation and probability interpretation of wave mechanics. Uncertainty principle. Application to one-dimensional problems, the harmonic oscillator, orbital angular momentum, and the central force problem. Quantum theory of scattering. Born approximation. Phase-shift analysis, introduction to S-matrix theory. General formulation of quantum mechanics in Hilbert space. Spin. Identical particles and symmetrization principle. Time-independent and time-dependent perturbation theory. Semiclassical theory of radiation and atomic spectra. Addition of angular momentum. Wigner-Eckart theorem. Quantum theory of radiation. Absorption, emission, and scattering of photons. *Prep.: PHY 1415 or equiv.*

PHY 3624 Advanced Quantum Theory

4 Q.H.

Introduction to the formulation of a relativistic quantum theory. Study of the Dirac equation and its Lorentz covariance. Plane-wave solution of the Dirac equation, and projection operators. Bound-state solutions of the Dirac equation in a Coulomb field and the hydrogen atom. Parity, charge conjugation, and time-reversal symmetries. Propagator theory. *Prep.: PHY 3623.*

PHY 3631 Statistical Physics A

3 Q.H.

The phenomenological theory of thermodynamics. Fundamental relations and thermodynamic potentials. Extremal principles of thermodynamics. Applications to simple systems. Stability conditions. Phase transitions. Thermodynamics of electric and magnetic systems. Principles of irreversible thermodynamics. *Prep.: PHY 3603 and PHY 3621 (concurrently).*

PHY 3632, PHY 3633 Statistical Physics B, C

3 Q.H.

The principles of statistical mechanics and statistical thermodynamics. Density matrix. Theory of ensembles. Derivation of the laws of thermodynamics. Fermi-Dirac and Bose-Einstein statistics. Application to gases, liquids, and solids. Theory of phase transitions. Second-quantization formalism for interacting systems. Cooperative phenomena. *Prep.: PHY 3631, PHY 3621.*

PHY 3641, PHY 3642 Solid State Physics

4 Q.H.

The course covers topics from Drude and Sommerfeld (or free electron) models of electrons in metals, crystal structure, one-electron states in crystal lattices, Bloch's Theorem, semiconductors and semi-conducting devices, effects of electron-electron interactions, lattice vibrations and the classical and quantum theories of specific heat,

optical properties of solids, investigation of crystal structure and excited states of crystals by X-ray and neutron scattering, simple transport theory based on the Boltzmann equation, magnetic properties of solids.

III. Advanced Electives

PHY 3643, PHY 3644, PHY 3645 Advanced Solid State physics A, B, C 4 Q.H.

Selected advanced topics in the theory of solids to be chosen each time by the interested students and instructor. For example, theory of normal metals, Hartree-Fock and Random phase approximations, optical and transport properties, solid-state plasmas, Raman spectroscopy, quasiparticles and collective excitations, quantum solids, amorphous solids. *Prep.: PHY 3633, PHY 3623, PHY 3642.*

PHY 3653, PHY 3654, PHY 3655 Particles, Fields, and Currents A, B, C 4 Q.H.

Introduction to a local field theory. Symmetries of the Lagrangian and conservation laws. Lorentz group, spin and helicity. P, C, and T. Klein-Gordon, Dirac, vector meson, photon and non-Abelian gauge fields. Gauge theories; Feynman path integral formulation. The S-matrix and LSZ reduction formulae. Spectral representations. Feynman diagrams. Green's functions at large Euclidean momenta. Renormalization and finiteness. Quantum chromodynamics. The renormalization group and asymptotic freedom. Spontaneous breaking and Higgs phenomenon. Glashow-Salam-Weinberg unified theory of weak and electromagnetic interactions. *Prep.: PHY 3624*

PHY 3661, PHY 3662, PHY 3663 Many-Body Theory A, B, C 4 Q.H.

Introduction to some many-body problems and the required mathematical techniques. Theory of linear response and correlation functions. Landau's theory of Fermi liquids and applications to solids. Theory of superconductivity and superfluidity. General theory of Green's functions and diagrammatic techniques. *Prep.: PHY 3633, PHY 3623, PHY 3642.*

PHY 3671 General Relativity 4 Q.H.

The course discusses the physical basis underlying relativity (the weak and strong principle of equivalence), the role of the metric tensor as a carrier of gravitational information, and the modification of the Lorentz covariant field equations in the presence of gravitation. An introduction to Riemannian geometry is given, and the Einstein field equations and tests of Einstein's theory are discussed. *Prep.: PHY 3672, PHY 3603, PHY 3613, and PHY 3623.*

PHY 3672 Relativistic Astrophysics 4 Q.H.

The course deals with the equations for the relativistic stellar system, white dwarfs, neutron stars and properties of pulsars, gravitational collapse and black holes, quantum radiation from black holes, super heavy stars as possible quasar energy sources, quantum effect in gravitational collapse, the metric for cosmological systems, and the big bang theory. *Prep.: PHY 3671 and PHY 3624.*

PHY 3673 Quantum Gravity 4 Q.H.

The course deals with gravitation as a quantum field, threshold properties of gravitational quantum S-matrix, quantization leading to a set of Feynman rules, calculations of simple tree diagrams, closed loop infinities and the problem of renormalizability of quantum gravity. *Prep.: PHY 3672*

PHY 3798 Master's Thesis Continuation 0 Q.H.

PHY 3799 Doctoral Dissertation Continuation 0 Q.H.

PHY 3811, PHY 3812, PHY 3813 Reading Course 1 Q.H.

PHY 3821, PHY 3822, PHY 3823 Reading Course 2 Q.H.

PHY 3831, PHY 3832, PHY 3833 Reading Course 3 Q.H.

PHY 3841, PHY 3842, PHY 3843 4 Q.H.

Reading course, or theoretical or experimental work under individual faculty supervision. *Prep.: Consent of faculty member.*

PHY 3895 Doctoral Dissertation

Experimental and theoretical work for Ph.D. candidates.

Political Science

All courses carry three quarter-hours of credit unless otherwise specified. Most courses are seminars.

ECN 3111 Economics for Public Administrators

Introduction to basic economic concepts essential to other courses in the program. This course is a prerequisite for students lacking economic course work at the baccalaureate level.

POL 3500 Scope and Methods of Political Science

This course is designed as an in-depth examination of the assumptions, principles, etc., that underlie contemporary political science. As such,

it invites the student to consider the present practice of the discipline in the light of its history and to critically evaluate the discipline in the interest of a greater understanding of nature and limits.

POL 3502 Seminar in American Government

Analysis in depth of selected problems in American government. Examples of problems include transition of American political parties, legislative reapportionments, and the decline of Congress as a law-making body. *M.P.A. elective.*

POL 3504 Political Psychology and Socialization

An examination of theories of political psychology, opinion formation, and attitude change; of political ideology; of processes of individual political development and socialization; of effects on mass and elite political behavior; of attitudinal differences and differential socialization experiences; of individual political behavior and the political system.

POL 3506 Politics and the Mass Media

Study of the role of mass media in the formation of public opinion, with special attention given to media usage in the electoral process.

POL 3508 Legislative Process

Study of Congress and of the influence of the President, administrative bureaucracy, parties, interest groups, and public opinion on the development of legislative policy. Comparisons are made with legislative process in the states. *M.P.A. elective.*

POL 3510 Theories of American Political Participation

This course focuses on political behavior at both the national electorate level and at the level of legislative roll-call voting, analyzing the relative impact of demographic and attitudinal components as well as the effect of constituency and partisan identification upon legislative behavior.

POL 3512 American Constitutional Law I

Employing excerpts of U.S. Supreme Court decisions and other primary legal materials, this course examines the constitutional rationale for judicial review; various philosophical approaches to the exercise of judicial power; and the scope of judicial authority to settle questions challenging the legitimacy of governmental actions in the American constitutional system.

POL 3514 American Constitutional Law II

Using excerpts of primary legal materials, this course builds upon the judicial doctrines developed in POL 3512 and specifically examines the constitutional theories behind the growth of congressional prerogatives in economic and social affairs and expanding presidential power in internal and foreign matters. *Prep.: POL 3512 or consent of the instructor.*

POL 3516 The Presidency

An analytic treatment of the constitutional and extraconstitutional powers of the contemporary

president, an examination of the place and function of the chief executive in the formulation and execution of public policy. *M.P.A. elective.*

POL 3518 American Electoral Behavior

The theoretical and methodological assumptions of election studies of the American political system are analyzed and the substantive conclusions carefully reviewed.

POL 3519 Campaigns and Elections

A study of campaign tactics and strategies. *Field Work required.*

POL 3520 The Judiciary

Analysis of the role of the judiciary in the American governmental process. Special attention is given to those areas of constitutional law in which the courts' decisions have a profound impact on the basic structure of American politics (apportionment, economic regulation, federalism, etc.).

POL 3522 Political Parties, Pressure Groups, and Public Policy

A study of the role of parties and pressure groups in the policy-making process, trends in contemporary party politics are examined as well as behavior patterns of the American electorate.

POL 3524 Civil Rights

Examination of the doctrine of constitutionalism, illustrated and amplified by a study of the substance and process of the Bill of Rights as developed in decisions of federal courts, and congressional enactments.

POL 3526 Procedural Due Process

Utilizing excerpts from U.S. Supreme Court decisions and other legal materials, this course examines the philosophical and constitutional relationships between Amendments 4, 5, 6, and 8 and the Fourteenth Amendment. The substance of the right to fair trial, counsel, confrontation, protection against self-incrimination, and unreasonable searches and seizures are among the many procedural rights examined through the decisions of the Roosevelt, Vinson, Warren, and Burger Courts.

POL 3531 Models of Political Systems

A detailed examination and critique of current models of political systems.

POL 3533 Eurocommunism

A study of the ideology and political behavior of the communist parties of Italy, France, and Spain, with emphasis on their independence of, and challenges to, the domestic and foreign policies of the Soviet Communist Party.

POL 3535 Parliamentary Democracy in Western Europe

A comparative analysis of environment, vehicles of popular participation, and formal structures and reach of government in the parliamentary democracies of western Europe. Special attention is given to England, France and Germany.

POL 3537 Comparative Communism

A comparative analysis of environment, vehicles of popular participation, and formal structures and reach of government in the Soviet Union, the socialist countries of eastern Europe, and China.

POL 3539 European Political Parties

A comparative cross-national study of political organization and behavior in England, France, and Germany with emphasis on party leadership, strategy, organization, and constituency as well as socialization, recruitment, and participation of voters.

POL 3541 European Legislative Systems

A comparative analysis of the legislatures in Britain, France, and Germany with emphasis on patterns of historical development, functions, internal organizations, and relations with the executive.

POL 3543 European National Executives

A comparative cross-national study of executive decision making in England, France, and Germany with emphasis on varying patterns of presidential and cabinet authority as well as relationships with the legislature.

POL 3545 Government and Politics in the Middle East

This course examines the political and economic structures of the Arab states and Israel as well as inter-Arab politics and inter-state conflict in the area.

POL 3547 Government and Politics of North Africa and the Middle East

Comparative analysis of the political systems and foreign policies of African states north of the Sahara. Also stressed is the relationship of this area with the Middle East.

POL 3550 Government and Politics of the United Kingdom of Great Britain and Northern Ireland

An analysis of government organization and political behavior in the United Kingdom. Special attention is given to executive-legislative relations, the political party system, and the politics of Northern Ireland.

POL 3551 Seminar in International Relations

An in-depth analysis of the major actors, their goals, and the means and strategies they utilize within the international system.

POL 3552 International Political Economy

The course explores new directions in the field of international political economy. Stress is laid on approaches to and trends within the field, such as 1) the intellectual and theoretical roots of international political economy; 2) the management of collective goods; 3) relations between advanced industrial states; 4) relations between advanced industrial and less industrial states; 5) relations between nonstate and state actors.

POL 3553 Government and Politics in Germany

A study of political culture, federalism, and executive-legislative relations on the national level with a view to appraising the quality and durability of the present democratic system.

POL 3554 Government and Politics of France

A study of current governmental organization and political behavior in France. Special attention is given to the role of the presidency, executive-legislative relations, and the political party system.

POL 3555 International Organization

This course focuses on issues of international political economy. The role of various international organizations in managing economic interdependence is emphasized. Attention is given also to the role of international administrators in the UN's search for a new international economic order. Discussion of nongovernmental organizations, such as multinational corporations, is included.

POL 3556 China in Revolution

Addresses the problems faced by a revolutionary China in forming new attitudes, instituting a revolutionary political culture, and reconstructing and developing a country on the basis of a revolutionary ideology. Illustration of the manner in which the party, state, military, education, health, science, and medicine have been modified since 1949 to ensure the continuation of a revolutionary polity.

POL 3557 Soviet-Chinese Relations

A chronological and topical analysis of the Soviet-Chinese relationship since 1950 with special attention to the causes of rivalry and conflict in the 1960s and 1970s.

POL 3558 Asia and the Politics of Development

This course relates the theoretical literature on political development to the concrete attempts to develop in Asia. Because of the diversity in levels and types of political development in Asian states, each student is encouraged to concentrate on one state and explore different ideas about political development as they relate to that state.

POL 3559 Governments and Politics of Latin America

This course investigates contemporary Latin American politics with particular emphasis on revolution, development strategies, and social change. Focus is on three representative nations such as Mexico, Chile, and Cuba.

POL 3560 Development Politics

The process of political development in the Third World, including both internal and international issues such as leadership patterns, the role of the military and political parties, and underlying economic and social factors.

POL 3561 Great Powers and the Middle East

An analysis of the changing nature of great power and multinational involvement in the Middle East.

POL 3562 United States-Soviet Relations

The relations between the United States and the Soviet Union from 1917 to the present. Topics stressed are the "nonrecognition" period, the breakdown of the World War II "Grand Alliance," and the nature of the present power conflict.

POL 3563 United States-Far Eastern Relations

American diplomacy in the Far East, with primary concentration on relations with Japan since World War II, with China, and with Southeast Asia.

POL 3564 China's Foreign Policy

A study of the Chinese government's relations with the Third World socialist states and the West and its behavior in the United Nations. Analyzes changing policies toward international law, trade, tourism, scholarly exchange, and foreign ventures in China. Attention is given to policy objectives strategy, tactics, and the method of decision making in the foreign policy apparatus.

POL 3565 Soviet Relations with Eastern Europe

An analysis of Soviet policy in Eastern Europe, especially Russian efforts after World War II to develop communism and maintain a position of preeminence in this region.

POL 3566 Chinese Politics

Concentrates on the objectives of the Chinese revolution from 1911 to the present. Examines the political theory and institutions which have been established to promote "permanent revolution" and evaluates the nationality of Chinese communist policies in terms of Chinese goals. Concentrates on the changes made in domestic, economic, legal, and political policies since 1976.

POL 3567 Japanese Politics

Designed for students in both comparative politics and in international relations, the course examines the unique Japanese electoral system, political processes and organizations, political culture and socialization, the role of business in politics, and Japanese foreign policy.

POL 3568 Sub-Saharan African Politics

Comparative analysis of the political systems and foreign policies of selected African states south of the Sahara. Special attention is given to the Republic of South Africa and its policy of apartheid.

POL 3569 Decision Making in U.S. Foreign Policy

Comprehensive analysis of the governmental mechanism and process for decision making in U.S. foreign policy. Case studies in decision making are emphasized.

POL 3570 American Foreign Policy

Examination in depth of selected issues concerning the role of the United States in world affairs since 1945.

POL 3572 Problems of World Order I

Emphasizes such topics as appraisal of diverse systems of public order, approaches of interna-

tional law and international organization to the problem of world order, and the problem of world peace enforcement.

POL 3573 Problems of World Order II

Political problems of world order are stressed. Representative topics include arms control and disarmament, the limits of economic growth, international political economy, population problems, and resource distribution.

POL 3575 Arab-Israeli Dispute

The Arab-Israeli confrontation has its own dynamics and a character that has changed through the decades. This course analyzes its interaction with the internal politics of the Arab states and Israel, pan-Arab politics, and the role of the great powers in the region.

POL 3578 Soviet Foreign Policy

A study of Soviet foreign policy since 1964. Among the topics discussed are detente in relations with the United States; polycentrism in East Europe; involvements and commitments in the Middle East and Africa; and the dispute with China.

POL 3580 The United Nations

Selected topics on the nonpolitical work of the United Nations: human rights; economic, social, health and related problems; decolonization and the trusteeship system.

POL 3581 International Peacekeeping

A detailed investigation of the origins, history, and theory of interventionary peacekeeping, with reference to the documentation of the United Nations. An assessment of this method of maintaining regional stability and a projection of potential means of developing the method to broader applicability.

POL 3583 International Law

Examination of selected topics in international law not covered in POL 3572 and POL 3573.

POL 3584 Regional Organizations

Regional organizations, such as EEC or OAU, are studied to determine the capability of such organizations to promote economic development and political influence.

POL 3585 The Atlantic Community

A topical analysis of European-American diplomacy with particular stress upon security and economic matters. Major consideration of the integration of Europe, American responses, and the results of these interactions for world political and economic stability.

POL 3586 Nationalism

The evolution and role of nationalism in both theory and practice. Representative nationalistic movements and theories are analyzed.

POL 3587 Politics of Revolution and Change

Analysis of the nature of political change with attention to both theory and practice. Topics discussed are revolution, major trends in contempo-

rary politics, and the relationship between political change and technological, scientific, or social change.

POL 3589 Terrorism, Violence and Politics

Analysis of the theory and practice of terror, violence, coercion, force, and threats in political life.

POL 3590 Crisis Politics In Democracies and Dictatorships

Analysis of governmental response to crises and emergencies. Consideration of such topics as war powers, riot and rebellions, martial law, transfer of regime, succession problems, economic crises, presidential emergency powers, national security powers, executive privilege, and impeachment.

POL 3591 Totalitarianism

An analysis of totalitarianism and dictatorship, including study of historical background, fundamental characteristics; theories of origin, nature, and significance; and evaluation of techniques, ideologies, policies, and instruments of power. Special attention is given to the government and politics of the Soviet Union.

POL 3593 Ancient and Medieval Political Thought

The development of political thought from Greek antiquity to the end of the Middle Ages, utilizing both historical and analytical approaches. Attention is also paid to the cultural, social, and intellectual context within which political theories develop.

POL 3594 Modern Political Thought

Examination of political thought from Machiavelli to Marx.

POL 3595 Contemporary Political Theory

The main currents of political thought in the latter half of the nineteenth and the twentieth centuries with special emphasis on the relations between political theory philosophy and political science.

POL 3596 Marxism

Examination of the theory and practice of Marxism, including its background and origins, and its subsequent development.

POL 3597 Trends in American Political Thought

Examination of intellectual concepts and movements that have informed and influenced American political life, with emphasis upon those relating to the making and execution of public policy. *M.P.A. elective.*

POL 3600 Survey of Public Administration

Introduction to the literature and the major topics in public administration with special attention given to the interrelationships of politics and administration. *M.P.A. core course.*

POL 3601 Public Personnel Administration

Technique, practice, and organization of personnel functions in public administration, including recruitment, compensation, training, discipline, and relations with employee organizations. *M.P.A. core course.*

POL 3602 Organization Theory and Management

An in-depth study of the major organization theories, including the scientific basis for organization theory; models and ideal types; decision making; application of game theory, systems analysis. *M.P.A. core course.*

POL 3603 Public Finance and Budgeting

Emphasizes the public budgeting function in its relationship to other functions of public administration. The subject is approached from a management perspective, and conflicting legislative and executive finance and budgeting interests are examined. Also included is an illustration of the budget cycle and an examination of the mechanics of budget preparation. Attention is given to means for improving budget decision making and administration through quantitative and other methods. *M.P.A. core course.*

POL 3604 Techniques of Policy Analysis

Focuses on the various techniques useful in analyzing public policy issues. Case studies of specific applications of such methods as modeling, simulation, and survey research are examined. *M.P.A. elective.*

POL 3605 Quantitative Techniques for Public Administrators I

A consideration of the theory and process of administrative study including philosophy of science, quantitative and qualitative designs and methods of problem solving, and drawing causal principles. *M.P.A. core course.*

POL 3606 Quantitative Techniques for Public Administrators II

The application of social science research and computer programming to administrative problems, including techniques for analysis of survey and other data and practical methods of gathering, analyzing, and presenting such data. *M.P.A. core course.*

POL 3607 Quantitative Techniques III: Computer Applications

A continuation of the study of quantitative techniques, with particular emphasis on various computer usages for public managers.

POL 3610 Methods of Economic Analysis for Public Administrators

A central concern of this course is to introduce a construct of public economy as a means for focusing on contemporary issues facing public administrators. Both the concepts and applications of economic analysis are presented to offer the student a new analytical tool for evaluating public policy, implementation, and impacts on the citizenry. *M.P.A. elective.*

POL 3611 Intergovernmental Relations

An institutional-behavioral analysis of the changing relationship among the various levels of American government—national, state, and local—re-

lating the pattern of change to the social and economic forces which underlie it. *M.P.A. elective.*

POL 3613 Constitutional Law in Public Administration

An introduction to American constitutional law and the federal system using case materials and emphasizing principles of importance to public administrators, including such constitutional concepts as separation of powers, judicial review, dual federalism, legislative investigating power, executive impoundment, federal preemption, and the appointment and removal power. *M.P.A. elective.*

POL 3614 Administrative Ethics in Public Management

An analysis of ethical problems in American public administration including discussion of ethical dilemmas frequently faced by public managers. *M.P.A. elective.*

POL 3615 Development Administration

This course will focus on the output side of developmental administration from a management viewpoint. Particular emphasis will be placed upon implementation, evaluation, and project management skills, including management of public enterprises. While technically oriented, the course will deal also with practical problems of management in Third World systems such as strategies for the utilization of talent within the local community, etc.

POL 3616 State Government

Appraisal of the problems of contemporary state government in the United States. Particular emphasis is given to the state government of Massachusetts. Individual research is stressed. *M.P.A. elective.*

POL 3618 Problems in Urban Planning

An exploration of the resources available to the urban planner for policy implementation, including zoning, subdivision regular action, and capital improvement programs. Special emphasis is given to the planning of individual sites. *M.P.A. elective.*

POL 3619 Techniques of Urban Planning

A study of the history and techniques of city planning, stressing the elements of planning. *M.P.A. elective.*

POL 3620 Politics of State and Urban Planning

An investigation of the relationships of planning to other governmental functions with stress on practical processes, particularly at the municipal government level. *M.P.A. elective.*

POL 3621 Problems of Urban Development

An examination of the role of government and politics in the planning, programming, and administration of regional and urban development in the United States. Consideration is given to urban renewal; interurban and interregional competition; interstate compacts; public authorities; T.V.A.,

Appalachia, and New England regional development; antipoverty programs; and conflict between public and private interests. Individual research is stressed. *M.P.A. elective.*

POL 3622 Urban Government

The contemporary crisis in urban government—problems of political independence, government finance and administration, rapid growth of suburban and metropolitan areas, and decline and decay of the core city are stressed. Particular emphasis is given to the Boston metropolitan area. Individual research is stressed. *M.P.A. elective.*

POL 3623 Transportation Policy

Examination of the role of politics, governmental mechanisms, and public policy in the transportation planning process. Particular attention is given to political interest groups and the manner in which they affect transportation policy on the federal, state, and local levels. *M.P.A. elective.*

POL 3624 Problems of Community Development

Examination of the role of government, politics, and public policy in the urban process and related problems in the United States. *M.P.A. elective.*

POL 3625 Collective Bargaining in the Public Sector.

Study of the mechanism for labor relations in federal, state, and local government with its impact on the public manager. Emphasis is placed upon collective bargaining processes, tactics, and techniques. *M.P.A. elective*

POL 3626 Grantsmanship

This course provides students the opportunity to increase their knowledge of the federal grant system. Emphasis is placed on developing the ability to write effective grant proposals and on improving management skills.

POL 3627 Management Information Systems

The course studies the life cycle of a management system through its three phases: (1) study and design; (2) implementation; and (3) operation within the target organization. Focus is on exploring the impact which management information systems have and may have in the future on governmental managers, on their professional environment, and on the society which they serve. Various government MIS will be studied. The course requires no mathematical or data-processing background. *M.P.A. elective.*

POL 3629 Computers and Public Administration

A general orientation to the computer, its uses and operation, with particular attention to programming analysis, preparation and coding, and use of computer programs specifically written for governmental applications. *M.P.A. elective.*

POL 3630 Health-Care Administration

An examination of the politics and administration of health-services delivery systems, including a discussion of current topics in health-care admin-

istration and politics (e.g. national health insurance, health-maintenance organizations, physician assistants, citizen participation, administration decentralization) and an introduction to current developments in policy evaluation methodology and health-services research. *M.P.A. elective.*

POL 3631 Housing and Community Development

An introduction to exploration of two major urban social policy issues in terms of their political, economic, and social dimensions. Specific programs and issues in the metropolitan and New England region are evaluated. *M.P.A. elective.*

POL 3632 Public Fiscal Management

A study of the interrelationships in public administration between systems of finance and the achievement of program objectives. Emphasis is placed upon those aspects of the budgetary process that bear on fiscal policy and appropriations. *M.P.A. core course.*

POL 3634 Functions and Techniques of Public Management

An introduction to problems in public management and techniques for dealing with them including functions of middle management, supervision, administration of staff activities (e.g. planning, personnel, budget), organization and methods, public relations, managerial use of computer-based techniques, and tactics and strategies of management. *M.P.A. elective.*

POL 3635 Environment and Energy Policy

Consideration of the legal, political, administrative, and intergovernmental factors involved in the formulation of public policy and the exercise of public power in regulating the use of the environment. Individual research is stressed. *M.P.A. elective.*

POL 3637 Comparative Public Administration

A comparative study of approaches to public administration in selected democratic governments in the United States and Europe. *M.P.A. elective.*

POL 3639 Federal Administrative Law

Study of rule making, adjudication (formal and informal), administrative finality and judicial review, administrative procedure, scope of administrative powers, and enforcement techniques. *M.P.A. elective.*

POL 3640 Governmental Accounting

Examination of principles and procedures involved in governmental accounting. *M.P.A. elective.*

POL 3641 Techniques of Program Evaluation

A review of the various methods used to assess public policy including identification and categorization of outcome, input and program operation variables; types of research designs; and steps

needed to institute program change after completion of an evaluation study. *M.P.A. elective.*

POL 3642 Management Planning and Decision Making

A review of the growth of the planning approach to public management and of its application in specific agencies. Topics include organization of the management planning function, budget planning, and methods of providing planning forecasts. *M.P.A. elective.*

POL 3643 Organizational Psychology and Behavior

Examination of the literature, theories, and concepts of administrative behavior as it has evolved with emphasis on the development of self-awareness and the building of interpersonal skills. *M.P.A. elective.*

POL 3644 Public Policy Issues in Human Services

Discussion of the origins and development of the Social Security Public Assistance Income Maintenance and various health-care programs. The course content focuses on controversial public policy issues of retirement, survivors, disability insurance, Aid to Families with Dependent Children, Medicare, and Medicaid, with the objective of helping students to develop understanding of the push and pull of many different viewpoints involved in public policy development. *M.P.A. elective.*

POL 3645 Program Implementation

This course examines the implementation stage of the policy process, specifically the implementation of federally funded social programs by local governments. Topics include: intergovernmental fiscal configuration; the capacity to implement; the politics of implementation; implementation feasibility.

POL 3646 Position Management

An examination of the bases of position classification at the state, federal, and local levels. After reviewing the process of job analysis, the course examines several classification schemes including the new federal factor benchmark system. Final topics include wage and salary administration. *M.P.A. elective.*

POL 3647 Manpower Policy and Administration

Introduces the student to human resource policy and management issues within a broader context of social policy. Includes an investigation of specific manpower programs and current issues of importance to the administrator. *M.P.A. elective.*

POL 3649 Regulatory Administration

This seminar is designed to offer the public manager a conceptual and historical overview of the development of regulatory policy and mechanisms, focusing on issues at the public-private interface as well as evaluating the practical implica-

tions of government intervention. Also included is an evaluation of the political, economic, and administrative effects of a nonregulatory vs. regulatory approach to public management. *M.P.A. elective.*

POL 3650 Group Dynamics

Based upon an introductory understanding of organizational psychology and behavior, this seminar focuses on the human problems public managers face in their daily work. Using a group dynamics format, each participant will have the opportunity to integrate the literature in organizational psychology, work issues, and personal growth concerns. *M.P.A. elective.*

POL 3652 Civil Liberties in Public Administration

Discussion of First Amendment rights as they impact upon the public sector. Referring to appropriate court cases, topics include employee rights and obligations with respect to freedom of speech, freedom of association, loyalty oaths, and professional certification, as well as legislative powers. *M.P.A. elective.*

POL 3653 Survey Research for Public Administration

Focuses on the entire survey research process from sample selection to data analysis. Regression for time series analysis and some computer applications are discussed. *Prereq. POL 3605*

POL 3654 Computer Software for Public Administrators

This course will be offered as an elective at least once per year. The course will provide an introduction to several software packages for: statistics; management file construction and use, word processing, and graphics. *Prereq. POL 3605.*

POL 3655 Politics and Administration in Cities and Towns

An examination of the political and administrative structures which influence the conduct of city and town governments. Particular attention is given to the dynamic relationships between these structures and the implications for public policy-making. *M.P.A. elective.*

POL 3657 Organizational Analysis

A study of the structure and processes of organization essential for problem solving and for effecting organizational change. Emphasis is placed upon the application of social science theory and administrative principles in administrative problem identification and problem resolution. *M.P.A. elective.*

POL 3658 State and Local Finance and Budgeting

This course explores the many channels that the state budget must travel before it becomes a viable document. The several ways by which the budget can be affected before and after it is signed into law are explored in depth. *M.P.A. elective.*

POL 3659 Municipal Finance

A discussion of the special problems of budgeting and finance in local governments, including budget preparation and presentation, debt management, capital financing, and local taxation policy. *M.P.A. elective.*

POL 3660 Development Planning

This course will focus on the major techniques of analysis and planning in key problem areas of developing nations. Emphasis will be placed on the technical skills necessary to analyze and plan in major problem areas such as land use, population control, transportation, education, urban services, health services, etc. *Prereq.: POL 3604, 3605, 3606.*

POL 3661 Municipal Law

Designed for the nonlawyer, this course reviews the law of municipal corporations. Topics include general powers and duties, charters, ordinances, administrative rules and regulations, officers and employees, tort liability, policy powers, planning and zoning, taxation and borrowing, elections, and licenses and permits. *M.P.A. elective.*

POL 3662 Comparative Urban Government and Administration

This course analyzes decision-making structures and processes in selected urban areas, including an examination of world organization trends and implications for administration and politics of cities; changing scopes, scale, participants, and organization of urban politics; and selected issues such as urban housing, finance, leadership, planning and goals. *M.P.A. elective.*

POL 3663 Techniques of Public Budgeting

Introduction to the practical skills necessary for the formulation, evaluation, and presentation of budget data. Budgetary information (raw data) provided from computer simulations and from state and local governments is analyzed and adapted to various types of budget formats. *M.P.A. elective.*

POL 3664 Politics and Issues in Public Budgeting

The study of public budgeting in the context of the political, financial, and economic environment of present-day government. A heavy focus on contemporary issues and events which affect budgetary processes in the public sector is included. *M.P.A. elective.*

POL 3665 Women in Public Management

Analysis of the multiple roots of problems experienced by women in public management positions and solutions for alleviating such problems. Students are expected to engage in experiential learning exercises in addition to academic work. *M.P.A. elective.*

POL 3666 Housing Crisis

This course surveys the housing problems associated with the poor, the elderly, and middle-class

citizens. It studies housing policies which have been enacted on the national and local levels and assesses the impact of these policies.

POL 3667 Equal Opportunity in Public Administration

This course is designed to (1) examine barriers to EEO, (2) help students develop an awareness of issues surrounding the Affirmative Action Program and particularly some of the historical perspectives of discrimination against minorities and women; and (3) offer instruction in techniques for developing a meaningful equal opportunity program for public organizations. *M.P.A. elective.*

POL 3668 Legal Issues in Public Personnel Administration

A review and discussion of fact situations and evidence which give rise to public employment litigation with emphasis on civil rights and Equal Employment Opportunities court actions. Class discussion includes the type of evidence used in litigation and the types of defenses available to public employers. *M.P.A. elective.*

POL 3669 Labor Relations in Public Administration

Examination of various theoretical models for analyzing labor-relations structures and dynamics as well as their historical development in the United States. Where appropriate, attention is given to private sector patterns for comparative analysis. Among the topics treated are bargaining unit determinations, management rights and the scope of bargaining, coalition bargaining, impasse-procedure options, contract administration, affirmative action, civil-service traditions, and public sector unions. *M.P.A. elective.*

POL 3670 Public Relations in Public Administration

Focuses on evaluating the public manager's role in the process of communication with the public. Issues of imagery and accountability as well as current topics are evaluated. *M.P.A. elective.*

POL 3671 Social Welfare Policy and Administration

The historical, political, social, and economic determinants of the U.S. social welfare system are examined. Present policies and programs are analyzed using a dynamic systems model. Practical experience from all levels of government is included. *M.P.A. elective.*

POL 3673 Career Development

Designed to help students make career choices, identify their own career stages, and better understand their role as part of a work organization, with the purpose of assisting students in career planning. *M.P.A. elective.*

POL 3674 Federal, State and Local Financial Relations

As state supervision of and assistance to local governments in the area of financial administra-

tion is becoming increasingly important, this course explores the relationships between the two levels of government in the assessment and collection of taxes, budgeting, debt management, and state aid. In addition, the federal role and fiscal intergovernmental relations are evaluated. *M.P.A. elective.*

POL 3675 Health Policy and Politics

An analysis of health care policies, procedures, and alternatives.

POL 3676 Practices in Self-Development in Public Management

This course focuses upon practical aspects of public management. Topics include time management, communication (e.g., memorandum and report writing), control processes, and conflict management.

POL 3677 Elder Services Policy and Administration

This course investigates the historical, socio-economic and philosophical determinants of the emerging elder services system. Present policies and programs are studied using various comparisons, case studies, and dynamic models. Focus on contemporary problems in the administration of elder care delivery systems, funding sources, and future trends.

POL 3678 Federal Bureaucracy

Examination of dynamic and structural aspects of the national government, with attention to the place of the national administration in the federal system. *M.P.A. elective.*

POL 3679 Seminar in Development Administration

This course, undertaken after students complete the core as well as required concentration courses, will allow the student to deal with one or more problem areas in his or her country. Employing the skills developed in the Development Planning and Development Administration courses, students will develop plans and implementation strategies for a selected area(s) in their own nation, taking into account political, social, economic, and cultural realities. *Prereq.: All other concentration requirements.*

POL 3690 Topical Seminar

The program occasionally offers a special seminar dealing with current important issues relevant to public administration.

POL 3695 Seminar in Public Organization and Management

Analysis of specified topics and issues in public organization and management, with the purpose of presenting material of current interest and allowing in-depth research into specified areas where appropriate. Subject matter to be covered is described in registration materials. *M.P.A. elective.*

POL 3696 Seminar in Public Finance and Budgeting

Analysis of specified topics and issues in public finance and budgeting with the purpose of presenting material of current interest and allowing in-depth research into specified areas where appropriate. Subject matter to be covered is described in registration materials. *M.P.A. elective.*

POL 3697 Seminar in Public Personnel Administration

Analysis of specified topics and issues in public personnel administration with the purpose of presenting material of current interest and allowing in-depth research into specified areas where appropriate. Subject matter to be covered is described in registration materials. *M.P.A. elective.*

POL 3698 Seminar in Policy Sciences

Analysis of specified topics and issues in the policy sciences with the purpose of presenting material of current interest and allowing in-depth research into specified areas. Subject matter to be

covered is described in registration materials. *M.P.A. elective.*

POL 3699 Seminar in State and Urban Administration

Analysis of specified topics and issues in state and urban administration with the purpose of presenting material of current interest and allowing in-depth research into specified areas where appropriate. Subject matter to be covered is described in registration materials. *M.P.A. elective.*

POL 3798 Master's Thesis Continuation**POL 3890 Assigned Reading**

maximum: 6 Q.H.; minimum: 1 Q.H.

Assigned reading under supervision of a faculty member.

POL 3892 Internship Readings and Analysis

Academic credit directly related to an internship assignment.

POL 3895 Thesis

6 Q.H.

Thesis supervision by individual members of the department.

Psychology

All courses carry three quarter-hours of credit unless otherwise specified.

PSY 3111, PSY 3211, PSY 3311 Quantitative Methods I, II, III

A survey of the quantitative methods used in experimental psychology, emphasizing applications of computer programming, theory of functions and relations, curve fitting, probability functions, set theory, and analysis of variance.

PSY 3113, PSY 3116, PSY 3118, PSY**3115 Proseminar I, II, III, IV**

4 Q.H.

The departmental proseminar faculty lectures, student presentations, and discussions of the experimental literature in the following areas: learning, motivation; and behavioral analysis; sensation and perception; neuropsychology, language and cognition.

PSY 3119, 3219, 3319 Attention I, II, III

Seminars dealing with the topic of attention (selective and general, e.g., arousal, attentiveness, etc.). Behavioral, cognitive and physiological aspects will be discussed.

Learning and Behavioral Analysis**PSY 3121 Experimental Design in Applied Research**

Detailed study of experimental methods, emphasizing critical analysis of published research reports and the implementation of the methods in service settings. Students have the opportunity to learn and evaluate observational measurement and data-collection techniques. A feasible ex-

perimental design, with graphed actual or hypothetical data, must be written in the form of a scientific report.

PSY 3122, PSY 3222, PSY 3322, PSY 3422, PSY 3522 Applied Programming Seminar I, II, III, IV, V

Students are expected to design, test, and evaluate instructional programs for teaching specific subject matter for remedial application to behavior problems and to test instructional theory. Supervision is provided by a weekly programming research and data seminar in collaboration with the student's adviser.

PSY 3123 Programmed Learning

A review of the history and theoretical and experimental bases of programmed instruction and errorless learning. Emphasis is placed on the detailed analysis of stimulus control—its measurement, and ways to produce it.

PSY 3129 Mental Retardation Seminar

Interdisciplinary seminar taught by faculty from the several Boston-area universities associated with the University-affiliated facility. The role of each discipline in the care and treatment of retarded people is defined and coordinated with the functions of other relevant disciplines. Specialties include communication disorders (Emerson College), dentistry (Tufts University), medical disciplines (e.g., pediatrics, neurology, orthopedics, genetics—Massachusetts General Hospital, Har-

vard Medical School), nursing (Boston University), nutrition (Framingham Teacher's College), occupational therapy and physical therapy (Sargent College of Boston University), social work (Boston University and Simmons College), sociology (Brandeis University), special education (Boston University), and psychology (Northeastern University).

PSY 3132, PSY 3232 Behavior Intervention I, II
Students are given instruction in behavioral intervention techniques. Emphasis is placed on the functional analysis of behavior.

PSY 3133, PSY 3233, PSY 3333 Advanced Learning Seminars I, II, III

These seminars cover contemporary research in operant conditioning, with emphasis on relating the techniques of behavioral analysis to problems of reinforcement, motivation, comparative psychophysics, and physiological psychology.

PSY 3143, PSY 3243 Learning Principles and Applications I and II 4 Q.H.

An analysis of principles from behavioral learning research and their application to the process of behavior change for learning, remediation, and treatment. Particular emphasis is on educational settings.

PSY 3229 Administration of Mental Retardation Services

Presents comprehensive overview of general and specialized services for retarded individuals from organizational and administrative points of view. Issues in planning and initiating new programs, service delivery, staffing, and economics are covered. Visits to varied types of facilities focus on administrative concerns.

PSY 3321, PSY 3421, Systematic Inquiry in Applied Research I, II

Each student is expected to collect a comprehensive bibliography on a significant topic in applied behavior research and complete a thorough review via written and oral presentations. Emphasis is placed on the integration and analysis of experimental findings and theoretical foundations of the research area, the critical evaluation of current research, and the definition of potentially fruitful future work.

PSY 3649 Community Based Treatment 3 Q.H. (Prereq. Permission)

The treatment of mentally retarded individuals in a community setting.

PSY 3324 Behavior Change in Institutions

A review of successful projects which have been carried out to provide effective remediation and rehabilitation in institutions for the mentally retarded, the juvenile delinquent, and the developing individual (schools).

Sensation and Perception

PSY 3185 Electrophysiological Recording

Methods for recording electrophysiological activity from the human subject including electroencephalography, auditory and visual-evoked potential recording, electroretinography. Consideration of some of the principal findings that have been obtained with these methods and their importance for the interpretation of a variety of psychological phenomena.

PSY 3188, PSY 3288, PSY 3388 Vision I, II, III

Seminars: classical and modern problems in vision. Recent journal articles provide primary source materials for discussion. Consideration is given to problems of stimulus specification, retinal structure, photochemistry, and psychophysical measures of sensitivity, color vision, and electrophysiology.

PSY 3189 Psychoacoustics

This seminar deals with the relationship between sound and auditory perception. After five tutorial sessions on the physics and laboratory generation of sound, thresholds, masking, loudness, pitch, and sound localization, students are expected to lead discussions based on research papers in the psychoacoustic literature.

PSY 3289 Perception

A detailed consideration of research in such areas as form, space, and pattern perception, recognition, and the effects of set and motivation on perception. Physiological concomitants of perceptual phenomena are considered.

PSY 3418 Modern Psychophysics

A mathematical study of signal-detection theory; human and animal psychophysical methods; theory of the ideal observer.

Neuropsychology

PSY 3127, PSY 3128 Neurological and Sensory Impairments Seminars I, II

Etiology, assessment, and diagnosis, clinical characteristics, and education of the mentally retarded with visual, hearing, and motor deficits are studied. In addition to discussion, experiences are provided in evaluation and remedial programming, via the application of operant techniques.

PSY 3145 Human Neuropsychology 1

 3 Q.H.

This course in neuroscience addresses brain function and structure. Specific disorders seen in the clinical population are related to disfunction of the nervous system.

PSY 3151 Brain and Behavior I

An introduction to basic methods of physiological psychology, including animal surgery, electrical stimulation of the brain, electrophysiological recording, and histological techniques. Students

have the opportunity to gain experience in these methods by carrying out a limited research project during the semester. Enrollment limited to ten. *Prep.: Admission to doctoral candidacy or permission of instructor.*

PSY 3155, PSY 3255 Sensory Psychophysiology I, II

Concentration on the anatomy and physiology of the various sensory systems and correlation of these data with psychophysical and perceptual concepts. Laboratory work is included.

PSY 3159 Neurochemistry and Behavior

This seminar examines different experimental approaches to the problems involved in uncovering the relationships between changes in brain activity and changes in behavior produced by drugs. Discussions center on current theorizing on the role of early experience, environmental factors, biological rhythms, and other facets in the determination of drug-induced behavioral changes.

PSY 3225 Biological Bases of Mental Retardation

The course considers the relationship between biological malfunction, of the brain in particular, and the defective learning ability and other behavioral abnormalities which constitute mental retardation. The aim is toward as comprehensive a survey as time permits. Exercises include actual case presentations as illustrative examples.

PSY 3251 Brain and Behavior II

Selected topics in the neurophysiology of perception, emotion, motivation, learning, and memory will be pursued in depth, with emphasis upon a critical evaluation of recent literature. Enrollment limited to fifteen. *Prep.: Admission to doctoral candidacy or permission of instructor.*

PSY 3355, PSY 3455, PSY 3555 Physiological and Comparative Psychology I, II, III

Seminars: a shared background, key concepts, and central issues in the field of physiological and comparative psychology.

Language and Cognition

PSY 3126 Child Language Development

Learning theory approaches to language acquisition are contrasted with psycholinguistic and neurogenic theories. Works of Skinner and Chomsky are analyzed, and implications for both normal and abnormal language development are discussed.

PSY 3161, PSY 3261 Cognition and Psycholinguistics I, II

Research in cognition and psycholinguistics.

PSY 3166 Psycholinguistics

Seminar. In-depth analysis of research methods and findings in selected problems in the psycholo-

gy of language, including developmental, anthropological, and experimental psycholinguistics.

PSY 3169 Seminar in the Structure of American Sign Language

This seminar is designed to introduce students to current issues in linguistic theory as well as to update them on the specific literature on ASL research. Focus is upon one particular area of linguistic theory as it relates to current ASL research, e.g., phonology, morphology, syntax, semantics, or discourse (varies from year to year).

PSY 3264 Language Acquisition 3 Q.H.

An overview of issues in language acquisition will be integrated with in-depth discussions of selected topics.

PSY 3269 Linguistic Theory and ASL: Special Topics 3 Q.H.

(Prereq.: Introduction to ASL Linguistics or Introduction to Linguistics)

This seminar will vary year to year. Each year we will focus upon a particular body of literature related to current linguistic theory and its relevance to ASL. The course will involve extensive reading of current articles and dissertations in linguistics in general and in ASL Linguistics. Students will be expected to do presentations during the course of the seminar.

Experimental Personality and Social Psychology

PSY 3171, PSY 3271 Psychopathology I, II

4 Q.H.

A detailed consideration of the major forms of psychopathology, including the neuroses (obsessional states, hysteria, anxiety states, phobias), the psychoses (schizophrenia, mania, depression, paranoia), psychosomatics, sociopathy, conduct disorders, organic disorders, and mental retardation.

PSY 3371 Social Psychology

Survey of theory and research in social psychology. Topics covered include attitude and attitude change, aggression, altruism, group processes, person perception, and social cognition.

PSY 3477, PSY 3577, Personality Theory and Research I, II

A survey of representative theoretical formulations of the normal personality and its development, and an examination of experimental evidence bearing upon relevant concepts and assumptions (anxiety, repression, aggression, cognitive styles).

Special Topics

PSY 3291 Research Laboratory 1 Q.H.

Students and their faculty advisers discuss laboratory projects, current literature, theory, and applications.

PSY 3419 Special Topics in Psychology max. 9 Q.H.

PSY 3521 MABA Research 0 Q.H.

Students enrolled in the M.A.B.A. program may sign up for this course beginning in their *third* year to indicate that they are continuing their research.

PSY 3549 Practicum 3 Q.H.

Supervised practicum experience emphasizing the application of principles of psychology to human behavior.

PSY 3798 Master's Thesis Continuation 0 Q.H.

Continuation of experimental work for the master's degree requirement.

PSY 3799 Doctoral Dissertation Continuation

0 Q.H.

Continuation of experimental and theoretical work for Ph.D. candidates.

PSY 3891 Thesis

6 Q.H.

Experimental work for the master's degree requirement.

PSY 3894 Dissertation

0 Q.H.

Experimental and theoretical work for Ph.D. candidates.

Academic Calendar 1984-85

September 1984

3	Monday	Labor Day. University closed.
11-12	Tuesday- Wednesday	Fall 1984 registration—Burlington 1:00-3:00, 5:30-8:00
13	Thursday	Fall commencement.
17-20	Monday- Thursday	Fall 1984 registration—Boston 1:00-8:00
24	Monday	Classes begin in Graduate Schools for fall quarter.

October 1984

8	Monday	Columbus Day. University closed.
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November 1984

12	Monday	Veterans Day observed. University closed.
22-25	Thursday- Sunday	Thanksgiving Day recess.
27	Tuesday	Winter 1985 registration—Burlington 1:00-3:00, 5:30-8:00

December 1984

3-6	Monday- Thursday	Winter 1985 registration—Boston 1:00-3:00, 5:30-8:00
10-14	Monday- Friday	Final examination for Graduate Schools.
17-January 1	Monday- Tuesday	Christmas vacation.

January 1985

1	Tuesday	New Year's Day celebrated. University closed.
2	Wednesday	Graduate classes begin—4:00 p.m. or later.
15	Tuesday	Martin Luther King, Jr.'s birthday. University closed.

February 1985

18	Monday	Presidents' Day. University closed.
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March 1985

5	Tuesday	Spring 1985 registration—Burlington 1:00-3:00, 5:30-8:00
11-14	Monday- Thursday	Spring 1985 registration—Boston 1:00-3:00, 5:30-8:00
18-22	Monday- Friday	Final examinations for Graduate Schools.
25-30	Monday- Saturday	Vacation period.

April 1985

1	Monday	Graduate classes begin—4:00 p.m. or later.
15	Monday	Patriot's Day. University closed.

May 1985

27	Monday	Memorial Day. University closed.
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June 1985

10-11	Monday- Tuesday	Summer 1985 registration—Burlington 5:30-8:00
12-13	Wednesday- Thursday	Summer 1985 registration—Boston 5:30-8:00
10-14	Monday- Friday	Final examinations for Graduate Schools.
16	Sunday	Commencement.
17-22	Monday- Saturday	Vacation period.
24	Monday	Graduate classes begin—4:00 p.m. or later.

July 1985

4	Thursday	Independence Day. University closed.
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September 1985

2	Monday	Labor Day. University closed.
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3-6	Tuesday-Friday	Final examinations for Graduate Schools.
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12	Thursday	Fall commencement.
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9-14	Monday-Saturday	Vacation period.
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16	Monday	Beginning of 1985-86 academic year.
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Calendar dates are subject to change. The University community will be notified if such changes are necessary.





